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VOL. X • NO. 4 • OCTOBER 1972

DEVELOPMENT DIGEST

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We would appreciate comments of an editorial nature and suggestions of material for possible inclusion in the DIGEST. Please address:

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1525 - 18th Street, N. W.
Washington, D. C. 20036

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Use of funds for printing this publication approved by the Director of the Bureau of the Budget June 2, 1966.

For information on how to obtain the DIGEST, see inside back cover.

DEVELOPMENT DIGEST

A quarterly journal of excerpts, summaries, and reprints of current materials on economic and social development

Gordon Donald, Editor

Prepared by the NATIONAL PLANNING ASSOCIATION

for

Agency for International Development, U. S. Department of State

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(Unless otherwise indicated,
currency is expressed in U.S. dollars.)

DEVELOPMENT BANKING

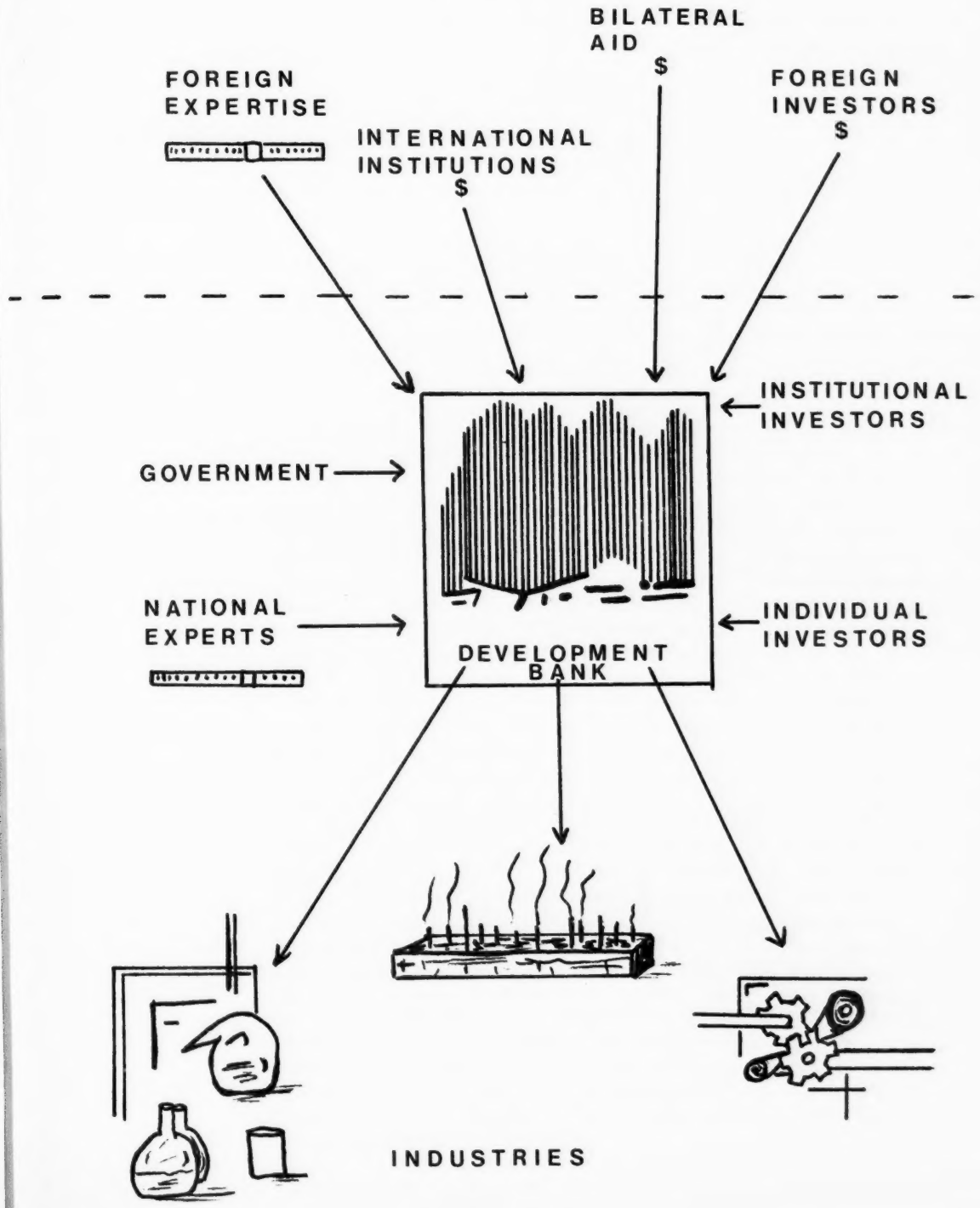

DIAGRAM ILLUSTRATING THE FUNCTIONS
OF A DEVELOPMENT BANK.

The Role of Development Banks

Comment and Quotations,
The Editor

[Development banks supply medium- and long-term financing for industrial growth, both from their own funds and from those they can attract into industrial investment. Requirements for starting and operating such a bank, and questions such as private vs. government ownership, are discussed.]

Development banks are specialized financial institutions supplying medium- and long-term credits, chiefly for the creation or expansion of industrial enterprises in developing countries. Certain other types of enterprise may also qualify for such support, but most of the financing needed for agriculture or for infrastructure is obtained from other kinds of institutions. Such special banks have been necessary in developing countries because the existing banks usually focus on relatively short term lending for commercial purposes (or buy government bonds, in the case of savings banks); these banks often set conditions of their loans that are inappropriate for new or large scale enterprises, and in any case they are not normally equipped with the expertise necessary to appraise projects involving complex industrial technology. On the other hand private capital markets, where much of the long term financing of industry originates in the older industrial countries, are very limited in scope if they exist at all in the newly industrializing nations. In addition, domestic capital is generally scarce, and those private savings that are available, when they have not been deposited in the commercial and savings banks, have tended to go into personal and commercial loans, land and houses, or overseas, rather than into long term loans or equity in unfamiliar industrial ventures; established industries were most often foreign owned, or in some cases domestic family affairs with limited capacity for expansion.

In order to perform their task of facilitating industrial growth in these conditions, development banks have had to combine a number of different roles. To function at all, it was first necessary to obtain capital for themselves, some of it from foreign assistance by official bilateral aid or the World Bank, much of it from their own governments. They had to develop a staff capable of judging the economic viability of potential industrial projects that would come to their attention, and to establish knowledgeable contacts with specialists and consultants who could supply the technical, marketing, and organizational expertise required for the detailed appraisals supporting the judgments of their staff. They had to build a reputation for sound judgment and a network of business contacts at home and abroad which would enable them to attract investors who would risk their money in the banks and in enterprises the development banks supported. Frequently these banks have become significant advisers to their governments on a wide range of policy questions and planning activities. And in many countries they have gone far beyond the usual banker's role into entrepreneurship, promotion, and even some managerial responsibility in enterprises in order to launch and guide them to success; this aspect of development banking is discussed in the next article.

Development banks are a relatively new phenomenon in Asia, Africa and Latin America. It is estimated that as of 1946 no more than a dozen viable institutions existed which could be so described. In the 1950s some important development banks were founded; since 1960 there has been a rapid increase in their numbers, which are now in the hundreds (varying with definitions of what to include), and in their financial resources. They are of diverse kinds; they have not been universally successful, of course, but certainly the history of leading institutions in a number of countries has been one of expanding investments made and attracted, increasing technical capabilities, a growing reputation, and a major contribution to industrialization. Their role appears to be generally increasing.

A distinction may be made between privately owned development banks—commonly referred to as development finance companies—and banks in which their government has part or total ownership. This distinction has been important historically, because the World Bank Group—until 1968—favored the privately owned institutions serving mainly the private sector, which gave them an initial impetus in obtaining "seed capital" and a relationship that could lead to valuable advice and expertise, foreign contacts, etc. The U. S. Agency for International Development (AID), the other major source of foreign support, has not drawn a line on public vs. private bank ownership but has tended to favor institutions financing the private sector. At the opposite extreme are wholly government banks financing only public sector enterprises. In between are banks of

mixed ownership and also a mixture of investment policies, varying in the degrees of specialization in financing geographical or industrial sectors, or in types of borrower—e. g., large or small firms. Development banks also vary widely in size, and in the kinds of resources they deploy—foreign exchange vs. local currency, types and terms of loans or equity investment, technical assistance available, etc.

Rather little has been published on the description or analysis of development banking; a few books are noted at the end of this article. The World Bank Group published a pamphlet on development finance companies in 1967, written at a time when Bank policy favored these private institutions. Portions of it have become outdated with the passage of time and the shift in World Bank policy to include support of government-owned banks, and there has been no comparable successor to it. Nevertheless the following passages quoted from this pamphlet (with minor editorial deletions and shifts) still provide a useful summary of some of the main features of this species of development bank; comments are added by inserts in brackets.

"The Role of National Development Finance Companies in Industrial Development

"Capital structure. Even with considerable government aid, it is unusual for a development finance company to be very profitable in its early years. The organizers of the company must plan the capital structure of the enterprise in such a way that investors will at least feel that their capital is safe from impairment, and that in the not-too-distant future they will begin to receive at least a modest return on their investment. Sufficient net earnings will have to be generated to cover the cost of adequate management and staff, the building up of adequate reserves, the payment of taxes and, as soon as possible, payment of a moderate dividend to shareholders. To achieve such earnings the company must plan on obtaining a substantial part of its resources from borrowed funds which can be lent at a higher interest rate than the company has to pay, and thus provide "leverage" to enhance the return on equity. The problem, however, is that the "spread" between the interest rate the company can charge its borrowers and the rate it must pay to conventional sources of capital—domestic, foreign and international—is rarely sufficient for a new company to become soundly established.

"Many of the development finance companies assisted by the World Bank have been able to obtain special government assistance in the form of so-called "quasi-equity," that is to say a long-term loan—usually about 30 years with 15 years' grace—interest-free or with a very low rate of interest, which will be subordinated to, or at most rank equally with, the share capital in case the company has

to be dissolved." [NOTE: This ranking refers to the order in which owners and creditors are paid if total assets are too small to pay all of them in full.] "The absence of interest gives the company a far better chance of reaching a profitable stage early in its life, while the subordination to equity provides a cushion to protect the shareholders in the years before adequate reserves have been established. For example, when the Industrial Credit and Investment Corporation of India (ICICI) was established in 1954, the capital resources of the Corporation included a 30-year, interest-free advance of 75 million rupees ($15.75 million) from the government, with a 15-year grace period. Similarly, when the Pakistan Industrial Credit and Investment Corporation (PICIC) was established in 1957, the capital resources of the Corporation included a 30-year, interest-free loan of 30 million rupees ($6.1 million) from the Government of Pakistan. In both cases the loans were subordinated to the share capital. A government loan on similar terms extended to the Industrial and Mining Development Bank of Iran (IMDBI) ranks equally with the share capital.

"A government may also support these finance companies by taking a minority participation in the share capital, and by giving preferential income tax treatment and guarantees of foreign loans. In some countries, as in Iran, the government has entrusted the finance company with the management of special public investment funds, for which a managing agency fee is paid."

[COMMENT: Today the term "quasi-equity" appears to have fallen into disfavor in the World Bank, and presumably the Bank would no longer insist that any government participation in equity capital be limited to a small minority share. It is worth noting that, even when the Bank was more reluctant to sanction government ownership than it is now, it clearly recognized the need for substantial government capital in some form to launch a development finance company for the reasons described. For other types of development bank this necessity is taken for granted.]

"Private domestic investors. On the domestic front a development finance company looks to two categories of private investors for participation: institutional and individual. Institutional investors are usually motivated by a mixture of public-spiritedness and an expectation of indirect benefits to their own businesses through a general strengthening of the economy. But sometimes inducements are necessary. For instance, commercial banks, industrial firms and trade associations took up the entire initial share capital of the Industrial Development Bank (IDB) of Turkey, but first the government had to guarantee a minimum dividend.

"Individual investors are harder to attract. For one thing, there are usually few to be found in the developing countries; and except

where the known investment alternatives are considered less safe or attractive than investment in the finance company's shares, they tend to adopt a wait-and-see attitude. They may well come forward later. There were no individual subscribers to the initial share capital of IDB, but a capital issue four years later was oversubscribed, and many of the subscribers were individuals. Some development finance companies reserve a percentage of the shares for individual investors as opposed to industrial groups and banks. When ICICI was established, it reserved 30 percent of the initial share capital for individual domestic investors; more than half the applications received were for fewer than 20 shares, selling at the equivalent of $420 at that time ($21 per share).

"Foreign investors. Most development finance companies have substantial foreign shareholdings, and there are several advantages in such participation. It may help to insulate management against local pressures to make or decline to make particular investments. It may promote a flow of external capital to local industry, and provide contacts with financial institutions in the capital-exporting countries. It may facilitate the importation of technical skills in industrial production and management. Finally, the evidence that overseas capital regards the company's shares as a fair risk may give confidence to potential domestic investors. According to preliminary figures for the close of 1966, foreign shareholders (largely United States, European and Japanese) have provided $47.5 million of the $280 million total share capital of the 25 institutions in which the World Bank and IFC have an interest; local investors provided $218.5 million and IFC $14 million.

"Loans. This equity base, supplemented in many cases by quasi-equity, has made it possible for development finance companies to obtain substantial additional resources in the form of fixed-interest loans. Loan funds have sometimes been provided by governments at commercial interest rates, but more often such loans come from international organizations, such as the World Bank or the Inter-American Development Bank, or from foreign governments as bilateral aid. Private foreign institutions have been a much less important source of loan capital.

"If quasi-equity amounts to one and a half times the share capital (the usual proportion), then the "borrowing base" of a company with a share capital of $1 million is $2.5 million. The World Bank has encouraged the adoption of this form of capital structure, feeling that a finance company may in time borrow several times the amount of capital, free reserves and quasi-equity. The company with $1 million share capital may thus in due course be able to command total capital resources of $10 million or more.

"Management. Since there is generally a shortage of skilled people with managerial abilities and investment experience in the less developed countries, at least the chief executive officer will often have to be recruited from abroad. Putting an experienced manager in from the start is important not only to get operations off on the right footing but also to begin the process of training nationals for senior positions. From the beginning of operations there must also be sufficient skilled staff to carry out engineering and financial appraisals and to follow up projects assisted. In our experience it has proved a false economy for a development finance company to wait until its income is large enough to cover the cost of such a staff. In the absence of capacity to make adequate appraisals, the investment of the company's resources is almost certain to be slow, or poor investments may be made. The key to this problem lies in the capital structure which should be so organized as to support a staff that can produce an adequate level of investments and earnings fairly soon.

"Investment Policies. New enterprises often require substantial equity capital, and most development finance companies are willing to make equity investments. But unless they operate in a reasonably well-developed capital market and with a fairly ready market for industrial securities (as in India), they would be imprudent to hold in their portfolios equities amounting to more than their paid-up capital and free reserves. One form of investment that may be especially well adapted to the needs of both the company and the client is the loan with equity features such as conversion rights or profits participation. Through this medium the development finance company should be able to secure a proper yield on its investment.

"Equity investments have many advantages for a development finance company. It is true that at the outset of operations, a loan portfolio generating regular and immediate income can be invaluable for building up reserves and meeting administrative expenses. But once the finance company is a going concern, the attraction of equity investments becomes very real. They enable the finance company to share in the profitability of successful enterprises, thereby adding to the company's income, providing a cushion against possible losses on other investments and demonstrating the attractiveness of industrial financing. Furthermore, by selling equity out of its portfolio, the company can help to spread share ownership and develop a capital market.

"Though an equity investment may very well suit the finance company, businessmen are frequently reluctant to share their ownership, since it usually means disclosing the details of their operations. Furthermore, they may be concerned about the direction in which the finance company may eventually dispose of its shares. PICIC, for instance, has found that some entrepreneurs would rather pay more to borrow funds elsewhere in these circumstances.

"In loan financing, a balance between the interests of the lender and the borrower must be reflected in the terms. The duration of loans must be long enough not to place undue hardship on borrowing enterprises, but also must be related to the duration of the finance company's borrowings. The company's loans will generally include a substantial grace period to allow for construction and start-up of the project. In some countries the government sets a maximum interest rate on loans. Whatever rates the finance company charges, they should bear a relation to the opportunity cost of capital. If governments impose a much lower rate—as some have done—they thereby tend to encourage uneconomic investment and to diminish the profitability of the finance company's operations. Irrespective of government control over lending rates, their upper limit is determined by the rate at which capital is available from alternative sources; reluctance to borrow from a development finance company may indicate that commercial banks or equipment and materials suppliers are able to lend at lower rates.

"Size of investments. The size of a finance company's individual investment is subject to rather severe limitations. Small loans and participations generally involve such a high degree of risk and, compared to the eventual yield, are so costly in terms of staff time absorbed in appraisal, administration and follow-up that companies are obliged to set a lower limit to individual operations, usually somewhere between $20,000 and $50,000. Thereby development finance companies almost completely remove themselves from the field of aid to small enterprises, even though in many countries such aid appears to be of great social and economic importance and may constitute the bulk of assistance needed in the private sector. In some countries attempts are being made to devise remedies." [COMMENT: The reluctance of development finance companies to make small loans has engendered growing criticism, and the World Bank has increasingly favored lower minimum values for these loans. But the basic problem remains: small loans are less profitable, and finance companies must make profits to survive and to expand their services. Other types of development bank have been organized for special service to small firms; these often require subsidies.]

"At the other end of the scale, dictates of prudence, which call for diversification of the company's portfolio, set an upper limit on the size of a finance company's investment in any single enterprise. As a matter of policy few finance companies will commit funds representing more than 15 percent of their capital and reserves to a single project. Furthermore, the policy statements of most development finance companies stipulate that the company should not provide more than half the finance required for any given project. Thus finance companies can offer direct financial assistance to large-scale

projects only within these limits. But here their international connections are especially valuable, for it is possible through them to secure participations from foreign or international financing institutions. Often a finance company has successfully recruited foreign capital by taking the lead in the financing and allowing the example of its own commitment to draw in the foreign investors. In a country with more than one development finance company, it would clearly be logical for two or more of them to join in supporting large ventures; this has been done in Colombia."

Public and Private Banks

The problems and requirements of development finance companies, as described, are not identical with those of government-owned banks, although there are many common elements since they share many common purposes and similar environments. All such banks are dependent on government capital in the beginning, as noted; in time, the private institutions should achieve more independence in their sources of funds, which implies a greater independence in investment policy. To do so, they must make profits—a demanding imperative, which may conflict with some objectives that some governments may wish to achieve in the banks' operations. Governments may, of course, try to impose their desires by regulation or other means, regardless of bank ownership. A key point, then, is whether governments have objectives which are to an important extent inimical to bank profits. If they do not, then their influence exercised through ownership shares need not deflect bank policies away from the search for profitability. In countries having relatively effective development planning in which plans are formulated using economic criteria, there should in principle be no conflict of this kind.

The kinds of objectives of governments that can conflict with profitability, or the kinds of contrary influence governments may exert if they are in a position to do so, are of two general kinds. One may speak of personalized objectives, when one or more officials see something to gain for themselves (or to lose to their rivals) if a development bank supports one project and not another despite the recommendations of experts, or contrary to the estimated relative profitability of the two. Personalized objectives can also be disinterested, as when a Minister sincerely believes a project to be valuable—and the experts and estimates might sometimes be wrong in the end. (Personalized objectives cannot be eliminated from the decisions of private development banks, of course.) The other type of government objective inimical to profits would be some kind of social concern, e. g., for aid to small firms, or for development of a backward, neglected region or sector. A social objective is most likely to be followed when an official or influential group espouses it strongly, and thus personally, so the two kinds of objec-

tives are not always separable in practice. Both "legitimate" social aims and the less disinterested personal aims of officials are more likely to be heeded to the extent that government controls or influences the investment decisions of a development bank. Insofar as profits are reduced, a bank's capacity to expand operations is limited; its growth may depend on continuing injection of government funds on concessional terms, or other indirect subsidies.

In many countries several kinds of development bank coexist, serving somewhat different clienteles. A comparison of pairs of private and public institutions in four countries—India, Iran, Pakistan, the Philippines—was made by Paul E. Roberts, Jr. (in Economic Development and Cultural Change, Vol. 19, No. 3, April 1971, pp. 424-437; University of Chicago Press). He finds, in brief, no significant difference between the private and public banks in the average size of their industrial loans nor in the rates of return on them, though the public banks were larger and made more loans per bank. Private banks had a somewhat larger asset total than the public banks but used a significantly smaller proportion of their assets in making industrial loans; debt/equity ratios were virtually the same. Private banks incurred significantly larger expenses per industrial loan, but nevertheless made significantly larger gross profits in proportion to amounts loaned, and paid a significantly larger share of this gross income in taxes. In India and Pakistan, Roberts analyzed the firms borrowing from both types of bank and found no significant differences between them in size, profitability or other measures. Since all the banks he looked into were relatively large and active ones, these differences are of interest. It appears that the private banks lent more carefully, sparingly, and profitably—on balance; public banks did more with their assets, and got less back from it for themselves or the tax collector. It is not obvious from the figures which did more for national development as a case could be made either way.

AID Spring Review

We shall conclude with a quotation from the "Summary of Findings" (unpublished) of an AID Spring Review. This is an annual program which produces background papers on a selected type of AID activity from different parts of the Agency and outside experts, and culminates in a conference in which worldwide findings and ideas are debated and conclusions drawn. The 1969 Spring Review dealt with "Intermediate Credit Institutions" (ICIs), of which development banks are the main component. AID has invested over $350 million in loans to ICIs during 1958-68, with the largest sums in Latin America followed by South Asia and the Near East, East Asia and Africa. Most of this has gone into countries with the more developed financial markets, but increasingly to the less developed countries; publicly

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owned ICIs received about 60 percent of the total, private ones 40 percent. Principal findings in this review of AID's experience were as follows:

"AID-supported ICIs have been generally successful at stimulating both a greater quantity and an improved quality of industrial investment. Most of this effect has been in the private sector, which has received most of their funds. Profitability records of the borrowing ICIs, and repayment records of their sub-borrowers, have to date been generally satisfactory. The effectiveness of ICIs in mobilizing domestic resources has been almost entirely through the stimulation of complementary investment to go along with their loans—the loans from most ICIs average only a third to two fifths of the total investment involved. Amounts of direct accumulation of savings by the ICIs, and purchases of equity shares with subsequent resale, have been disappointingly low.

"One major deficiency found in ICI operations arises from frequent distortions in the structure of prices in the markets in which they operate. Two views emerged in the discussion. One view held that ICIs should be guided by market price signals, and that ICIs—especially private ones—are not appropriate instruments for deciding sector criteria, rationing scarce foreign exchange, etc. The other view was that, where changes in government policies to eliminate price distortions were not practicable, this situation should not rule our efforts at offsetting policies or practices by the ICIs to correct for excessive protection, overvalued exchange rates, etc. This view also appeared to encompass the position that undistorted market forces might not always provide wholly adequate guidance; for example, they might not provide as much impetus as desirable in export promotion.

"The interest rate was widely agreed to be a frequently distorted price. Interest rates held down by laws or regulations were generally thought to be lower than is warranted in many if not most developing countries, and rates charged by ICIs are often at the low end of the scale. The availability of funds for medium- and long-term loans is generally of much greater importance to the potential borrower than is the interest rate—i. e., the prospect of obtaining credit on medium-term greatly outweighs a few percentage points on the interest charged. The interest rates charged to ICIs by AID and by the World Bank or others, generally include a subsidy—and sometimes a large one—to the ICI and/or its sub-borrower. It was generally agreed that a "lower-than-market" rate to ICIs might be justified to subsidize certain kinds of performance. There was, however, a widely-held view that the amount of the subsidy, its rationale, and who were its beneficiaries all appeared to be less fully understood than they should be, and that the providers of such subsidies should know and approve of the purposes served.

"Some difference between public and private ICIs was noted. The private ICIs appeared to be generally somewhat more efficient, at least in terms of the expeditious handling of loans. The public ICIs on the whole tended to be somewhat more development oriented—although to a much lesser degree than many had thought. There was considerable sentiment that sector criteria, special services, etc. were more appropriately expected—or required—of public ICIs than of private ones.

"Medium- and long-term lending to the smaller borrowers was round to be particularly scarce. Few regular ICIs make many really small loans, and there are very few specialized small-loan ICIs. There was general agreement that this was unfortunate, but also that it was due to numerous special problems. In general the high costs, small-scale administrative requirements, and needed geographic dispersion make very small-scale lending inappropriate for most existing ICIs, particularly private ones. Higher interest rates are appropriate to cover the higher risks and higher costs, but charging such rates is likely to be politically difficult because it may appear to be discriminating against the small borrowers. Technical assistance to the small borrower is likely to be particularly important, but is also difficult to organize and may have to be unmanageably great if potential entrepreneurs do not start with a substantial part of the needed skills."

Some Books on Development Banking

William Diamond, Development Banks, Baltimore, Md.: The Johns Hopkins Press, 1957.

Shirley Boskey, Problems and Practices of Development Banks. Baltimore, Md.: The Johns Hopkins Press, 1959.

S. L. N. Simha, Development Banks. Bombay, India: Vora and Co. Publishers Ltd., 1969.

The Promotional Role and Managerial Responsibilities of a Development Finance Company

E. T. Kuiper

[Development finance companies have in varying degrees taken on entrepreneurial functions in promoting new industrial enterprises, risking their capital and reputation in the process, and influencing the subsequent management of such enterprises. The degree of involvement with enterprises depends on the economic environment, which may or may not require such involvement, and on policy judgments. This essay is based on discussions at a conference of 18 chief executives of finance companies supported by the World Bank Group.]

The provision of capital is the hard core of the function of a development finance company. But, should it also help formulate, initiate and organize a proposal for industrial investment? Does it have such an entrepreneurial role to play, as well as a financial one? What are the circumstances and the ways in which a development finance company can appropriately and prudently take the initiative and the leadership in conceiving and fashioning proposals for new enterprises, organizing the finance for them, and carrying them out? What are the costs and risks of such activity? And what should be its subsequent relationships with management of enterprises it has helped to create?

The promotion of new enterprises requires the following steps, regardless of who performs the particular functions. The promoter will first identify a project that appeals to him, perhaps the manufacture

Mr. Kuiper, now retired, has been director of development finance companies in Indonesia, Pakistan, Ethiopia and Malaysia.

within the country of an article currently imported, or the processing for export of a primary product that presently leaves the country as a raw material. He will next formulate the project; he will make studies to establish the economic, financial, and technical feasibility of the venture. The studies must answer the following questions: Can we produce it? Can we sell it? Can we make a profit? If a project of importance is involved, the promoter will almost always have to seek expert assistance. If the venture passes this critical stage of formulation, the promoter may then pass to the phase of initiation. In this stage, technical know-how is engaged; partners, agents, and distributors are found; a capital structure is determined; and technical plans are blueprinted. Finally, the project passes to the stage of execution: financing is arranged, sites are acquired, tenders are solicited, contracts are closed, machinery is ordered, and so forth. A development finance company may contribute to the success of a venture at any one of these stages of project development. There is a thin line between "financing only" and "promotion," for effective financial appraisal involves a careful scrutiny of each of the factors involved in promotion. The difference reflects mainly the development finance company's degree of initiative, and the margin of risk it is willing to assume.

One development finance company associated with the World Bank Group was organized after World War II to assist in the rehabilitation of a country with an impressive prewar industrial history, but one that had greatly suffered from the War. This development finance company felt no need to engage in promotion; the country had an ample supply of entrepreneurial talent and of technical and commercial experience. The company was kept fully engaged in investigating interesting and ready projects, and its principal problems were the recruitment and training of a staff capable of handling applications and finding the capital to satisfy all credit applicants.

Quite different is the case of another development finance company organized in the late fifties in a newly independent country with no industrial experience at all, and with a small entrepreneurial class interested mainly in commerce and real estate. This finance company, which had a dynamic management, felt that it must supply the propulsive force. It therefore became the effective promoter, organizing surveys, engaging consultants and preparing projects that, for lack of outside interest, it financed fully or partly and, in many cases, staffed and managed. After some years of such activity, the management of the company justifiably felt that it had done something significant for the country. But the company was now suffering from its excess of zeal, because much of the institution's capital had been invested in the currently unsalable stock of industrial enterprises, some of which will eventually prosper, but others of which

may fail. The company is now in the process of reorganization, new capital is being injected and a new policy is being formulated.

Between these extremes there lies a whole range of variations in orientation and approach. The attitudes of the development finance companies associated with the World Bank Group toward promotional activities reflect the stage of economic development of their respective countries. The institutions most reluctant to engage in promotional activities are those in the more advanced of the underdeveloped countries with a large and active entrepreneurial class. Their preoccupation is with finding funds, stimulating the capital market, attracting foreign investment, and strengthening their staffs in order to deal more effectively with their many applications. In due course, as their capabilities and confidence grow, they may follow more enthusiastically the promotional example of the large, active and prosperous development finance companies in New York, London, and Paris, where they play a vital role in arranging mergers, attracting international investment, financing the reorganization or modernization of existing enterprises and underwriting. Promotional interest is also found at the opposite end of the scale: the development finance companies of countries with a shortage of entrepreneurs rightly believe that, although they may have a sizable lending business, their countries have opportunities which neither local nor foreign businessmen are grasping. And they consider that one of their legitimate functions is to step into the breach. In doing so, they face many problems.

The Elements of Promotion

All promoting starts with an idea. If a development finance company is development-oriented, it will constantly be coming up with new ideas. Such an orientation is more important for the success of a development finance company than the amount of capital at its disposal. The real test of the development finance company's effectiveness as a promoter of ideas lies in its contacts with private entrepreneurs, foreign and domestic. A development finance company can help bring men who have new ideas or technical knowledge together with men who have capital. The function of negotiating such a marriage is particularly important in bringing foreign and domestic businessmen together. Close and continuing contact with the private business community is crucial. Through its day-to-day business contacts, a development finance company can bring its knowledge and experience to bear on the investment proposals of others; if it has good international connections, it will be in a position to bring the experience of other countries to bear upon the local situation. A development finance company can also act naturally and effectively as a liaison between the government generally and the national planning authorities in particular, on the one hand, and the investing community on the other.

It should be noted that none of these activities engages the finance of a development finance company. They engage, rather, its philosophy and the time of its management and staff. Development finance companies that cannot yet invest any funds in equity investment or do not yet have a margin of income for expenditure on surveys and research, can nevertheless be active and effective in influencing others, both government and private businessmen. It would be naive to think that the catalytic function of a development finance company will go very far if the company is not prepared to back ideas with capital. The capital, however, need not be its own. If a development finance company combines a dynamic approach with sound judgment and persistent endeavor, the necessary capital is likely, in the long run, to be forthcoming—provided, of course, that the opportunities for investment exist and that the political climate is favorable for economic growth.

Consultation and study. If initial inquiries regarding the idea for a project suggest that systematic investigation will lead to concrete results, the development finance company must hire consultants to survey the field or to help formulate a specific financeable proposal—or drop the matter without further ado. Good consultants are neither cheap nor easy to find. Because the development finance company is a profit-oriented institution, it can rarely afford to contribute substantially to such studies, even though it may have initiated them. It will be able, and prepared, to do so only if it can clearly visualize the prospect of recovering its outlay later on while executing the project. Such a prospect is more likely if the study or survey is narrowly focused. A general economic survey is the least likely to pay off; a study of a specific project is the most hopeful. In some countries, governments have established funds to finance industrial surveys or project studies, to which development finance companies may have access. It has often also been possible to obtain grants from foreign governments, international agencies, foreign foundations and universities. Some Latin American development finance companies have sponsored "study funds." They have formed groups with other financiers and industrialists, especially foreign ones, for further study of a specific project or of an entire sector. The study group (or "promotion company," as it is often called) retains consultants and receives and considers all the pertinent information.

When to promote new companies. Development bankers would generally be content to restrict their promotion to the activities discussed thus far: advising, suggesting, helping locate technical and financial partners, arranging for general surveys and for the study of specific projects—without much financial risk. But where there is not a plentiful supply of entrepreneurs working to exploit investment opportunities and seeking capital to finance them, it must sooner or later wet its feet in the treacherous waters of company

promotion. The classical approach to starting new companies is for a development finance company to begin with ordinary medium- and long-term loans. As its work proceeds, it considers other ways of financing, such as by convertible loans or debentures or equity investments. It then advances to the more complex forms of promotional activity, such as promoting companies independently. As the staff becomes more experienced and as the portfolio of the development finance company is seasoned, there will be a more solid base for promotional work. In the newly emerging countries, however, many development finance companies cannot follow this classical pattern. The sponsors of the company may have been correct in assuming that there were favorable development opportunities, and the company may have a capable staff. Nevertheless the flow of applications may be disappointing in the first years; in such circumstances, one must promote through "pump-priming." Unless the sponsors of the development finance company have made a serious mistake, there will be projects that can be studied by the staff; the staff will learn its business by trial and error and through contacts with more experienced foreign companies.

It is a good rule for a development finance company that service to its clients should normally take precedence over its promotional activities, and that when sufficiently knowledgeable businessmen show an interest in a project that has been promoted by the company for its own account, the company should share its findings with these entrepreneurs. Yet even development finance companies that follow this admirable counsel of self-denial cannot expect always to escape the charge that they are competing with the business community and neglecting the interests of their clients when they themselves take up promotional activities. In addition, there are business and political groups in every country that will resent any promotional activity by a development finance company because they suspect that funds and attention are being diverted from matters which interest them. It should be remembered that development finance companies differ in one vital respect from the private entrepreneur when promoting new enterprises for their own account. The individual businessman usually intends that he or his group shall own and control the venture for a long time to come, whereas development finance companies have no desire to create enterprises that they must control; they expect to divest themselves of ownership and control in due course, and at a profit commensurate with the initial work and risk.

The development finance companies that operate in countries in which a capital market already exists or is in the process of developing, find that they can assist in floating new industrial ventures by underwriting part of the share capital required for offering on the stock exchange. Thus, the development finance company becomes both a partner in the promotion and a co-sponsor of the project. In

view of the thinness of the capital market in underdeveloped countries, a development finance company engaging in an underwriting should be prepared to become a substantial investor; for it is more likely than not to be unable to sell all of the securities it underwrites. A somewhat similar role is played by the financial institution that forms a syndicate, or finds equity capital privately for a new venture; many development finance companies in developing countries perform a useful function in this manner.

The development finance company may also prepare an overall financial plan, and use its connections and specialized knowledge to arrange a package deal to provide all the finance required for the project, in whatever form. Foreign investors, as well as national governments, usually prefer a form of joint enterprise in which part of the equity is owned by nationals of the country in which the venture will operate. At the inception of a project, it is often difficult to interest local owners of capital; in these circumstances, a development finance company may, for some time, fill the gap. This has the added advantage of giving the foreign investor confidence that, during the sometimes difficult early years of his enterprise, his partner is not an uncertain and perhaps impatient group of individuals, but is rather a far-sighted institution of prestige.

Requisites for promoting new companies. The extent to which a development finance company may assume promotional functions depends on two factors, apart from the entrepreneurial environment and the presence of potential projects: capital structure and staff. So far as capital structure is concerned, promotion cannot prudently be carried out with borrowed funds. A substantial equity, and a willingness to wait for a return on it, are vital if company promotion is to loom significantly in the activity of a development finance company. On the staff side, a development finance company will have to attract for its management and senior positions people who combine the alertness of the promoter with a prudent approach to commercial and financial problems. Common sense, and the wit to recognize what one does not know, are more important for the financier than specialized knowledge.

Costs and risks of promotion. In the long run, the success or failure of the promotional efforts of a development finance company will be judged by its own Profit and Loss Account and its own Balance Sheet. Since the lack of capital is one of the main impediments on the road to economic development, a loss of capital resources is always detrimental to progress. Financial institutions that cannot built up reserves, cannot declare reasonable dividends and cannot show promising profit prospects for the future, will be unable to attract capital and will therefore fail to pull their weight in the march forward. The crux of the matter is that development finance

companies must try to combine profit-making with a developmental orientation. Promotion is both costly and risky, and the management of a development finance company engaged in promotion must keep an ever-vigilant eye on both the costs and the risks. The costs of promotion are, first, the salaries of personnel devoted to promotional work, plus part of the salaries of the executive staff, general office expenses, etc.; and secondly, out-of-pocket expenses for services supplied by consultants, travel, laboratory research, etc.

Even if the project promoted is successful, it is often difficult to recover these costs from the sponsors who carry out the venture. The older and more experienced development finance companies have learned they may not do too much work on a scheme unless they are confident that they will ultimately receive a fair return from the exercise, in the form of a profitable loan operation, underwriting commissions or an equity participation. The costs of study and research may often run into high figures. But while the project is still under study, losses can be cut in time if the promotion shows no promise, and financial involvement may be limited if there is danger that the amount budgeted for the study will be exceeded. All the same, more than one development finance company has incurred losses in dead-end studies and has learned from the experience.

Many development finance companies receive substantial support for promotional expenses from their governments and sometimes from foreign aid funds. One such company associated with the World Bank Group receives an annual grant from its government to cover a major portion of the salaries of specialized staff devoted to promotion. In general, such arrangements have worked fairly well and the governments have not attempted to exert undue influence on the type of study undertaken or on the choice of entrepreneur for project implementation.

The major financial consequences of a promotion, whether favorable or unfavorable, derive not from the costs of the studies undertaken but from the equity investment in the project which the development finance company has decided to back. This is the real risk, even if the equity investment is camouflaged as a "secured loan." But such risks must be taken. They can be avoided, and should be, if studies backed up by business judgment suggest that the risks are not justified. But if everything has been done to establish and to strengthen the inherent soundness of a project, a development finance company may be more to blame for not showing the courage of its conviction than for taking a well-considered equity risk. Most development finance companies have adopted policies to limit the size of each such equity risk (to a given percentage of net worth) and to limit their aggregate total (to net worth itself). Such a restriction helps safeguard the liquidity and viability of the development finance company. There

may be justification for feeling that such investments in equity will, in due course, be profitable; but the time that is likely to elapse before dividends are paid and shares can be sold may exceed the period for which the participating development finance company can afford to forego the income and lock up funds. Another useful device for restricting commitments is to avoid taking a controlling position in an enterprise.

The greatest non-financial risk of promotion is overinvolvement. "Pet projects" often go wrong. Overdevotion to promotions may result in underdevotion to clients. Both may result in loss of the respect and confidence of the business community—without which a development finance company cannot survive. In general, there seems little doubt that in promotion one may incur considerable losses, not only for a development finance company but also for its partners and for the public which it has enticed into investment. It is encouraging, however, that practically all the development finance companies associated with the World Bank Group have thus far avoided most of the pitfalls, and some have done fairly well in the field and are confident of their ability to expand these operations in the future.

Involvement in Enterprise Management

When a development finance company promotes, sponsors or finances an enterprise, it risks its capital and reputation; and it often influences others, both individuals and institutions, to risk their capital as well. This is a grave responsibility, which calls, in the first place, for the careful selection of investment proposals. No factor in selection is more important than a judgment regarding management, and a decision that management is satisfactory—technically, commercially, administratively, and in terms of honesty. But satisfaction with management before the investment is made is not enough. Management remains a matter of continuing concern thereafter, especially when the enterprise is a promotion of the finance company. But there are differences of opinion on how this responsibility of a development finance company can best be carried out.

Obtaining information. It is a common experience that management and staff devote much more time and effort to project preparation and loan negotiations than to keeping themselves well informed on the current activities of clients in whose businesses their institutions' money is at risk. Yet it is extremely important to keep in close touch with clients. Personal contacts on the technical and policy levels are needed, but no less important are more formal relationships, through regular audits and end-use inspections, i.e., frequent, periodic assessments of performance. If this is to be done, provision must be made in the loan contract to give the development

finance company the right to ask for information and to carry out inspections, imposing on the borrower the obligation to supply all information required. The discrepancies between projection and performance, and the problems that come to light from the reports and during the inspections form a useful subject for discussion between the financiers and the client, and lead to opportunities for consultation about measures for improvements. Follow-up investigations are generally carried out by the staff of the development finance company, but it is often useful to enlist the services of independent consultants. It is usually a condition of a loan contract that the client must retain independent auditors satisfactory to the development bank, and that the auditors should be chosen from a penal presented by them to their customers. Such audits should be made available as a matter of routine; they, with other detailed reports, create the foundation for a constructive relationship.

Usually, but not always, the client knows his own business best, although the development finance company may have a broader range of experience from which suggestions can be drawn to help a specific client. Every banker has much to learn from his clients; unless he is willing to learn more every day about the special intricacies of particular situations, he will soon find it impossible to maintain a relationship of confidence. He should always remember that the managers of these enterprises remain responsible for their operations.

Representation on boards of directors. When development finance companies underwrite or finance in one way or another a very substantial amount of the total cost of a venture, information gathering and inspections may not be considered sufficient. A seat on the board of directors may seem to be called for. Experience differs widely in this respect because no two boards operate in the same manner. For instance, some boards meet every week, and others once a year. Sometimes board meetings are cut-and-dried affairs; sometimes discussion in the board brings out facets of an operation that cannot be appreciated in any other way. What is important in this respect is the personal relations established between directors and managers and the candid opinions expressed during meetings which are usually not placed on record. Another advantage of a directorship involves the timeliness of information and of possible intervention. Audits, reporting and follow-up inspections are retroactive, in the sense that they inform after the event. On the other hand, a board is normally informed of prospective decisions before they are taken; a development finance company represented on a board may often have a chance to put in a word at the most opportune moment, and then exercise an influence which follow-up, audits, and reports will not allow. Such influence, however, implies a degree of involvement in the enterprise which many finance companies do not welcome. In some cases it could even give rise to a conflict of interest for the board member in question, e.g., on dividend policy.

Clearly there are many pros and cons on the issue of putting representatives on boards of client enterprises. The finance companies associated with the World Bank Group have widely differing views on the subject. In general, they seemed agreed that they should be represented on boards when they own an amount of stock large enough to justify such representation. But there was no consensus on whether to take a seat on the board of a company to which a loan had been given. Some felt a finance company should never go on the board of a debtor company; other institutions invariably take the right to nominate a director, but exercise it sparingly. None seemed keen to put nominees on boards of debtor companies because this usually involved the financial institutions in responsibilities and conflicts of interest without giving it extra powers; but it was generally agreed that there is sometimes no suitable alternative to protect the interest of the institution, of the public, or of a particular enterprise.

Direct participation in management? It is not surprising that, as a rule, development banks refuse to be directly involved in management. First, there is the human angle. A good development banker should have some entrepreneurial and managerial qualities, but he is usually stronger on the financial, technical and administrative sides. More important, a development finance company is set up to serve many clients in many fields of activity, and it should not identify itself with the interest of one particular enterprise in one particular field; by doing so it risks compromising its position vis-a-vis other firms in the same industry. Finally, there is the financial principle that a development bank should place its investments with prudence and with proper diversification. Involvement of a development finance company in the management of a company would mean that two functions are merging into one; the function of the entrepreneur who should go ahead, take risks, expand, and the function of the financier who should ask questions, restrain, and urge caution.

Notwithstanding these sound arguments, there are exceptional cases where such managerial responsibilities should be undertaken by finance company staff. Three instances may be cited. In some countries clients with constructive ideas and funds to back them are conspicuously absent; yet the development finance company feels there are really promising possibilites. The company then has to take the responsibility for promoting, for if it does not do this, nobody else will; and there is often no alternative to involvement in management if the promotion is to be successful. A second type of situation would be when a development finance company has been asked to administer a portfolio of government participations in industry. It may find that some of these enterprises need reorganization and that it is impossible to find qualified outside managers. Still another kind of case involves jeopardy. Where an investment

has gone sour, the taking over of management may offer the only alternative to outright loss. The development finance companies which have entered, directly or indirectly, into the management of the client enterprise have never done so lightly, and have done so in the conviction that there was no acceptable alternative and that the situation would be temporary.

[Excerpted from Chapters 1 and 3 of Development Finance Companies: Aspects of Policy and Operation, William Diamond (ed.). Baltimore (Md.): The Johns Hopkins Press for The World Bank Group, 1968, pp. 5-23 and 49-58. Copyright © 1968 by The Johns Hopkins Press. Reprinted with Permission.]

A New Deal in Development Banking

Chelliah Loganathan

[Development banking institutions should be geared to encouraging not only growth in production but a wider distribution of economic power and ownership. Present trends are toward increasing concentration of private ownership and/or expansion of the public sector; some proposals for fostering broad-based savings and investment are outlined.]

A fundamental dilemma faced by leaders of developing countries is: how can these countries achieve economic and social adequacy—let alone fulfillment—without recourse to totalitarian methods? Most leaders schooled in liberal traditions generally prefer a democratic form of society as one of their objectives. Are they fighting a losing battle? Can economic progress be achieved, and the disparity between the "haves" and the "have nots" be reduced, only by centralizing all power in a monolithic state or by repressive legislation and violence? The proposal to be described here is intended as a method of addressing this basic dilemma. In terms of conventional ideologies it contains elements that may appear novel, or unfamiliar, but wise leadership should at least have an open mind, and be prepared to appraise critically new ideas, adopting or rejecting them in the national interest.

Some of the important deficiencies in the economies of most developing countries, particularly small ones, which are adverse to development and particularly industrial development, may be described as follows:

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a. Markets are narrow, and are based on a pattern of income and wealth distribution marked by conspicuous inequalities in both rural and urban areas, which reduces the potential for mass markets. A substantial proportion of the population remains outside the market economy practicing subsistence agriculture; transport bottlenecks further accentuate narrowness of the markets for industrial goods.

b. Fragmented and uncoordinated entrepreneurial activity has resulted in high real cost of production in the absence of economies of scale; and large-scale industries are not feasible, except in a few cases, because of the constraint imposed by the technically determined minimum size of machinery in the context of the small size of the market. Small-scale entrepreneurs lack technical, purchasing, marketing, organization and accounting skills; they are undercapitalized and, lacking access to bank credit, have to rely on expensive unorganized money markets.

c. There is a lack of adequate measures and institutional devices to promote and mobilize savings and channel them for investment. Monetary and fiscal policies, particularly interest rate and tax policies, consciously or unconsciously, encourage the concentration of economic power—either in the hands of a relatively few individuals, or in the hands of the state; and there is a lack of broad-based money and security markets.

d. The resulting conflicts between the "haves" and "have nots" create many political problems and have an adverse impact on growth. The trend towards state ownership is a symptom of this conflict; and nationalization of large-scale enterprises is largely due to the fact that they are usually identified with closely held companies.

Efforts to bring about a reduction of inequalities, however, should not reduce the investment capacity of the community. Every endeavor must be made to increase the savings and investment capacity of the community and to direct it into the most desirable investments, taking into account the needs of the masses. Capitalists are traditional savers and investors. The masses generally are traditional consumers. The leveling down of the relatively few rich and the leveling up of the masses should be achieved progressively, and must be accompanied simultaneously with an increase in the investment capacity of those who constitute the masses, so that the savings and investment capacity of the community as a whole, which is so essential for economic growth, will not be jeopardized.

Methods For Mobilizing Savings

The United Nations and its agencies have from time to time issued reports on the subject of savings in great detail. They cover house-

hold savings; savings through commercial banks, purely savings institutions, life insurance organizations and provident funds; corporate savings; public savings through tax measures as well as from profits of government undertakings, and through restraint of government expenditure. They also cover fiscal and monetary incentives and such institutional devices as unit trusts. Education of the people on the importance of savings has been tried out both extensively and intensively by governmental and private organizations. All these incentives and devices have had varying degrees of success depending on the country concerned. Generally speaking, however, the efforts that have been made from time to time to encourage savings and investments have not been adequate for the needs of economic growth in newly developing countries. One common feature of most of the devices has been their dependence on purely voluntary savings, and on the wrongly assumed desire of the people, particularly at lower income levels, to save and to invest. Another common feature is that the savings are largely utilized by the state for its own requirements, or by a small and restricted capitalist class.

Among the various methods examined, provident funds providing savings for employees by deductions from their wages have been popular where they have been implemented, and also quite successful in the quantum of savings mobilized. Such schemes have never been objected to by the employees, and there is evidence that employees are often prepared to increase their contributions if employers would increase theirs. Provident fund schemes are generally popular even though the contributions are rigidly compulsory and the returns very small, and although the funds cannot be withdrawn until retirement or death of the member. The members ultimately receive their savings in the form of cash which has usually depreciated in real value, even over short periods of time. Nevertheless such schemes are popular because the political and economic environment does not provide adequate safeguards to other forms of investment, such as equities, also because the funds are usually invested in government securities and there is a false notion that these securities are "safe." It is not appreciated that they do not provide any hedge against inflation. Further, the savings mobilized in this way could often be better employed for development if they were invested elsewhere than in simply adding to total government resources.

Unit trusts, or mutual funds (in U. S. terminology), have the advantage that they can create investments in the private sector and are a convenient means of providing investment opportunities for the small man. But they are defective in that they do not provide adequate and direct incentives for savings, nor increase the willingness of the small income earners to save on their own initiative. The proposal to be described combines demonstrated advantages of the provident funds and the unit trusts; the safety and security of smallholder savings will be considered below.

create a series of corporations for different economic activities, without giving scope for monopolistic controls, and if the shareholders constitute cross-sections of the masses of the people and enjoy adequate voting power within their corporations, then it can be said that a diffusion of economic power has been achieved to some extent, although there is not equality of ownership. The institutional device to be formulated below will have the joint-stock device as one of its ingredients.

A diffusion of economic power can also be achieved through the cooperative system. I have no opposition to any genuine expansion of cooperative societies based on voluntary joint action of persons with common interests. Unfortunately, however, the tendency in developing countries is for the governments to convert the cooperative movement into a convenient appendage of the bureaucracy and a quasi-government organization to serve as an instrument of the state. The environment in developing countries is such that it will be difficult in practice for the cooperative system to avoid such control and to conform to the needs of democracy while at the same time serving as an effective organ of economic growth in a wide—rather than localized—context. The shareholding system in the cooperative movement, with restrictions placed on the transfer of shares and the distribution of profits, does not provide the same incentive for greater productivity as is provided by joint-stock corporations. In socialist countries, agriculture under cooperatives or collectives has been a failure so far as productivity is concerned; the successes achieved have been in the building up of agricultural surpluses to support industrial development. The joint-stock device is more appropriate for both production and distribution in most fields of economic activity, particularly in fields where economies of scale are possible and desirable.

The institutional formulation described here should be considered a type, not a model or blueprint, for the reason that many variations in it will be necessary to suit different countries and situations. It must also be emphasized that this scheme does not deal with each and every problem of development; it is meant to focus attention on certain basic problems.

Development Savings Bank

The key institutional device which lies at the heart of this proposal is a "Development Savings Bank." It will obtain its funds as far as practicable from compulsory and/or voluntary contributions from every individual who is on the pay sheet of every employer within the government and private sectors for the credit of the respective employees. Suitable incentives and inducements will be provided to make such contributions attractive to the employees concerned. These contributors will become "members" of the Bank. Where provident

funds already exist, these could be merged into the Development Savings Bank with the consent of the members. The Bank will also receive from employers compulsory and/or voluntary contributions for the credit of their employees.

In addition to this basic source of funds, which sets the course of the Bank in the direction of creating a "people's sector" but which will remain limited in amount for some years, other sources of funds must be mobilized to strengthen the institution. Some of the ways in which this could be done are the following: The Bank will receive tax rebates from government for the credit of taxpayers, in blocked accounts for investment in their names in approved projects. It will receive voluntary contributions from income-taxpayers for the credit of their accounts, which will be deductible within limits as an expense in their income tax returns. It will receive from non-income-taxpayers and other categories of persons voluntary contributions for credit of their accounts, under certain inducements. It will receive from government such part of the aid granted by foreign governments or institutions in the form of gifts, as may be determined by the government and aid donors, for the benefit of certain classes of the members of the Development Savings Bank. Aside from such contributions, the Bank may contract for domestic and/or foreign loans on behalf of its members.

Just as the Development Savings Bank employs a wide-ranging flexible policy in seeking resources, so it can deploy a flexible array of methods for making investments on behalf of its members. The funds of the lower income groups would generally be invested in the private sector. Since such an individual's savings will be small and most of these members will have scant knowledge of business, a useful device will be to consolidate these savings in unit trusts (mutual funds) which make equity investments in several enterprises; the owner of a unit in the trust has a fractional share in the trust's overall equity holdings, the value of which depends on this overall value. The small contributors to the Development Savings Bank will be given shares in the different enterprises in the private sector via these unit trusts. Resources mobilized by the Bank from the higher income groups, on the other hand, will generally be channeled into direct investments in projects or enterprises in keeping with any development policy of the government concerned, provided such investments are beneficial to the members themselves. Thus, the Development Savings Bank will generally be a savings institution and an investing agency rather than an investment holding institution or a lending agency. Only the investments of its common funds could be held in its own name, and that only within limits in any one company.

A country can choose to have as many Development Savings Banks as desirable and feasible, on a regional or other basis. They may

be large or small, and specialized or non-specialized in their investment activities. The constitution of the Banks will provide certain safeguards to the members against undue interference by government.

Value of Equity Investments

A feature of this scheme which may appear most unfamiliar, and in need of explanation is the emphasis on moving funds from small savers into equity investments in their own names. It is not easy to get poor people to save when they own a bank account or a bond, and the value of what they have is defined in a way they can understand—i.e., an assured sum of money. When it is defined instead as a unit of ownership in a trust which holds units of ownership in other companies, and when the small man's unit is shifting in value depending on the activities of people he does not know, then a lack of confidence can be anticipated; voluntary savings in this form may be hard to elicit, and compulsory savings may well be resented. Yet a reasonably well managed equity investment fund should increase somewhat in money value where there is at least some inflationary trend, as there is in most developing countries and very substantially in some. A demonstration of this fact is needed to build small savers' confidence, which implies that the equity units be salable and that some actually be sold for a rewarding price. However, such sales must be hedged with limitations to prevent erosion of capital and to restrain the tendency of low income savers to sell assets for consumption purposes. A minimum holding period, say for a year, a requirement for delay between any decision to sell and the actual sale, or an individual savings minimum which cannot be sold, are devices that—together or singly—could serve this purpose.

In addition, it would be desirable to supply a guarantee of the value of small savers' assets by ensuring that the income from these investments would not fall below a determined level. Such a scheme could be supported by a National Capital and Dividend Equalization Fund, specially created from grants and low interest loans from the government revenue, and perhaps also from aid agencies of capital exporting countries and international organizations. Its main purpose would be to guarantee a minimum return on certain classes of investments in the hands of defined classes of investors at the low income level. This same Fund, if it could be sufficiently strengthened, could also stand ready to purchase such investments in the hands of the classes of investors referred to at prices that would not be less than those at which they were originally purchased by the investors concerned. If the value of the Fund builds up, provision may also be made for this Fund to grant loans to certain classes of Bank members subscribing to the scheme to enable them to purchase approved investments, if their existing savings are inadequate, on the basis of repayment from future savings. Given honest, compe-

tent management of the investment trusts, equities should normally appreciate in terms of money in view of both the government and people's commitment to the promotion of the private sector. General inroads into the National Capital and Dividend Equalization Fund to maintain equity values would normally be absent. The Fund should grow from strength to strength, as is true of well managed insurance companies, so that it could absorb even abnormal shocks.

Assuming that small equity investments for savings can be made familiar and relatively safe, they have several advantages. The flexibility that equity capital gives to firms as compared with borrowed money is well recognized in the more highly developed capital markets where such a choice is available. For the small equity owner, such ownership should impart a sense of participation in his country's development which is now generally lacking. This sense may be sharpened by the experience of actually receiving some return on his money, however small, and by its variability—hopefully in the direction of growth. It should give him a stake in the development effort, and in the future. It might be desirable to keep the size of the unit trusts rather small, to enable the owners of their units to develop some knowledge of the identity of these trusts and their activities, and eventually to have some notion of choice in investment decisions. Large unit trusts, however, may be better managed and give their small owners more sense of prestige from the association. There is much to be learned from experience in this untried field of incentive creation.

A question may be raised as to how people with no initial financial resources, especially in the poorest countries, could be enabled to participate in the ownership of companies on the basis of future savings. The answer is that a government which is prepared to implement the Development Savings Bank scheme and its supporting schemes should also be prepared to sell shares in existing or new state corporations to such persons on credit. Appropriate loan schemes under installment payment plans could enable state corporations to sell shares to those who are already in permanent employment, or self-employment, and are potential members of the Development Savings Bank. Government could borrow, if necessary, to lend to workers and to small savers at appropriate interest rates to enable them to buy shares in the state corporations. In this way the government would eventually realize some of its assets for cash, and may then need fewer additional resources to finance any expansion programs of its corporations.

Need for Broad-Based Companies

At least some economic activities, as noted earlier, must be undertaken by organizations large enough to mobilize sufficient re-

sources for substantial economic growth with modern technology. What is required, in addition to the numerous small enterprises on which developing countries must depend for many economic activities, are large corporations, with provision for immediate or gradual broad-based ownership wherever feasible, along with foreign investment participation where appropriate, in order to achieve meaningful economies of scale and international competitiveness. The Development Savings Bank scheme, with the necessary ancillary measures to support it, could be used to broaden the base of ownership of these corporations through the joint-stock device. Mutual funds and unit trusts could bring ownership shares within the reach of small savers through the Development Savings Bank. External grants and loans extended to the Bank could give support to schemes aimed at broad-basing the ownership of industrial enterprises by financing installment purchases of shares. Other enterprises such as large transport, trading, agriculture and tourist companies, could similarly be broad-based. Government and foreign capital could also play their roles in conjunction with the small investors.

In the case of agriculture, and of business activities which are more appropriate for small private companies owned by proprietorships or partnerships, the funds lying to the credit of individual savers in the Development Savings Bank could be released for investment in forms other than shares under appropriate regulations to preserve the objectives of the Development Savings Bank scheme. It may be that new forms of organization of enterprises can be devised which would be appropriate in these fields. In agriculture, in particular, there is need for new thinking on organizations which could—more effectively than traditional cooperatives—supply coordinated facilities for procurement of inputs and tools, for marketing, and for supervision of credit uses, and which could also mobilize rural savings in ways not available to commercial banks. This might perhaps be accomplished by a new kind of joint-stock company which could organize medium or large farm operations and supervise credit uses more effectively than government bodies. Appropriate regulations might be devised which would make it possible to tie such companies into fruitful financial relationships with the Development Savings Banks.

If the economy of a developing country were organized around companies with broad-based private ownership, along with the small private enterprises, and with one or more Development Savings Banks generating small savings to flow into these companies, then the political connotations of private enterprise would be significantly improved. The economic advantages of the market mechanism could operate in an atmosphere of popular acceptability, and state ownership with its implied inefficiencies and regimentation would lose its appeal.

Appropriate Tax Policies

It will be necessary for governments to provide tax incentives for the formation of broad-based joint-stock companies, particularly in countries where the stock or share markets are narrow. Governments could also consider the conversion of some of their existing public sector corporations, in gradual stages, into broad-based public companies. Extra tax incentives should be provided to employers to increase their contributions, through profit bonuses or otherwise, to the accounts of their employees for investment purposes through the Development Savings Bank. The following tax proposals are based on a suggested law that I have drafted for my country, Ceylon; they should be considered as illustrative of measures which may be adapted for conditions in other countries.

One incentive could be, say, the exemption from tax of the first Rs. 500 [Ceylonese currency] of any dividend declared by broad-based joint-stock companies approved for the purpose, or the first Rs. 1,000 of any dividend declared by an approved unit trust or investment trust, provided however the dividends are not declared more frequently than twice a year. Another incentive could be the continuance of the non-refundable company or corporation tax in the case of private joint-stock companies or public companies whose shares are closely held or are not listed for transactions in the share market, while making the tax refundable in the case of broad-based and listed public companies, investment and unit trusts approved for the purpose. This measure would be beneficial to the low income investors, such as workers.

Any capital gains tax imposed on the sale of approved essential investments should be very low, and should be refunded into a special account in the name of the taxpayer concerned and maintained in an institution such as the Development Savings Bank. Such refunds should be released only for reinvestment in approved projects within a specified period. The purpose of this proposal is to encourage in the first instance essential investments and, once they have achieved stability, to induce their sale to low income groups such as workers who should look for safety and stable returns. The tax structure must also encourage a greater element of "risk bearing" among the richer classes of the country to meet the needs of the economy. Thereafter they must be induced to sell their more secure investments to the low income groups who should be encouraged to prefer security and reasonable returns to insecurity and high returns.

There should be a ceiling on the rate of income tax at 50 percent with appropriate adjustments on the different income levels. An extra charge over and above the adjusted rates of taxation should then

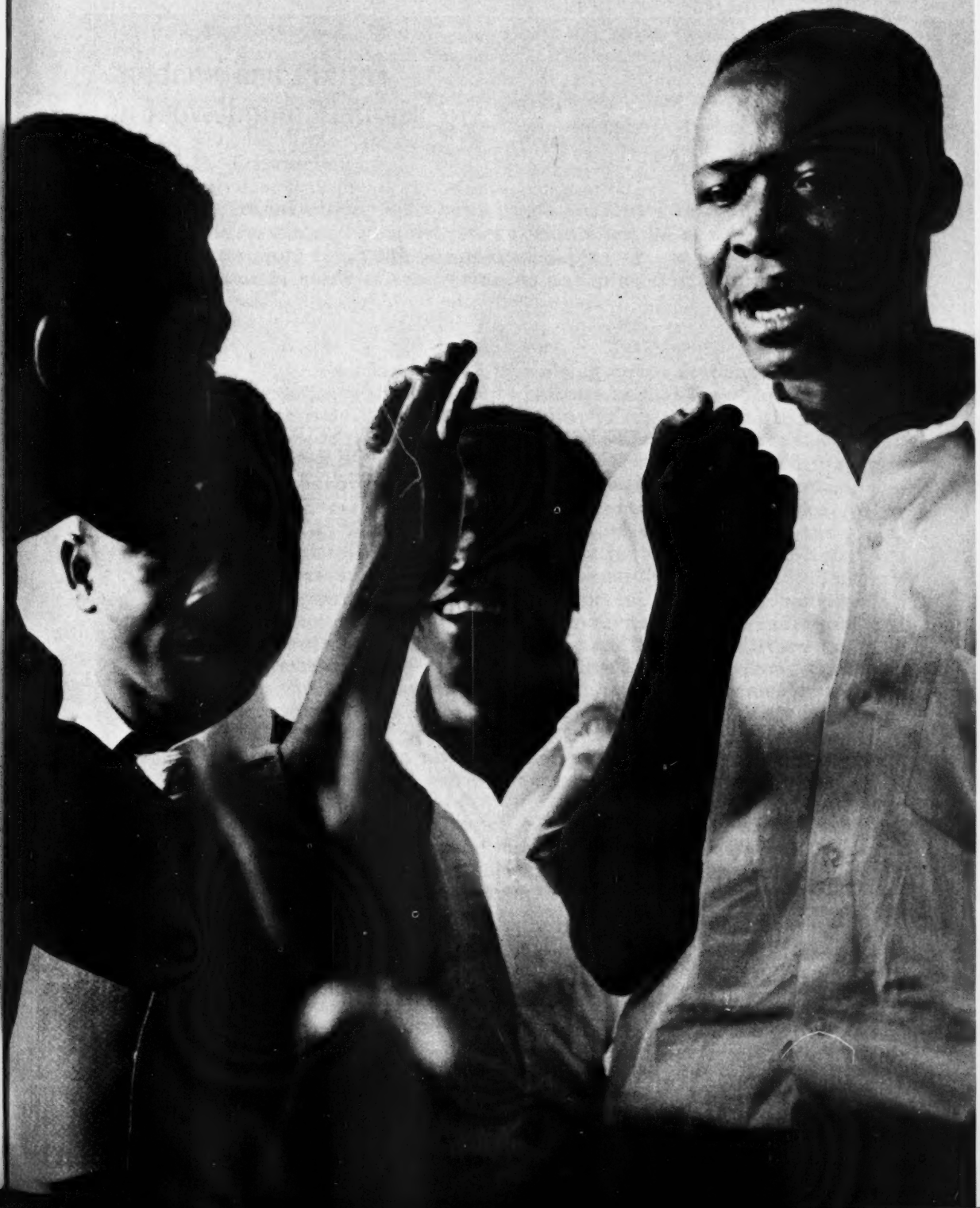
be levied. A part of this levy should be refunded to the credit of the taxpayer's account in the Development Savings Bank for investment only in approved projects within a specified period. The remaining part should be paid into the National Capital and Dividend Equalization Fund described earlier, or a similar fund for the benefit of low income investors. In order to inaugurate or expand the capital market, a company could be established to function as stock or sharebrokers, in which the Development Savings Bank or the National Capital and Dividend Equalization Fund would have a controlling interest.

No tax concessions should be allowed on investments in government securities, or on savings or term deposits with banks or other institutions, as such concessions tend to discourage investments by the rich in risky enterprises in the private sector. These concessions are also not equitable for the reason that such concessions do not benefit in practice the low income savers because generally, their aggregate incomes are too low to be taxable. Higher interest rates on the savings of small savers would be preferable to tax concessions.

The various tax concessions suggested may in the short term reduce substantially tax revenue and, consequently, the resources needed for government expenditure. The various proposals, however, if successfully implemented, would tend to increase the national product, and at the same time reduce, everything else being equal, the requirements of government for finance. A restricted but efficient government sector functioning alongside an expanded and broad-based private sector, with the worker and the common man having a stake in it and being sensitive to their responsibilities, and supported by increased foreign private investment, would certainly contribute to increased output and larger revenue even at lower levels of taxation. If the economy operates on the basis of the proposals formulated, there will be no harm in the government borrowing within limits even to meet part of its current expenditure. Deficit financing against a background of increased personal savings and investment and productivity would have a less harmful impact on the economy than in the present environment which encourages a higher rate of personal consumption.

[Adapted from Development Savings Banks and the Third World. A forthcoming book from Praeger Publishers, New York, May 1973. All rights reserved.]

STUDENT ATTITUDES



DEBATE FLOURISHES AMONG STUDENTS
AT THE NATIONAL SCHOOL OF LAW AND
ADMINISTRATION, KINSHASA, ZAIRE.

Students and Politics in Developing Nations

Donald K. Emmerson

[Student political movements have made headlines in many countries, but their strength and pervasiveness should not be exaggerated. This report, extracted from the summary chapter of a survey of 19 countries, examines some of the variables associated with student political activism.]

A major danger in writing about student political activity in developing nations is that its ubiquity, intensity, and striking triumphs may blind us to its absences, fragility, and no less striking failures. The roster of governments whose downfall followed major student protests is long—for example: Venezuela in 1958, Japan in 1960, South Korea in 1960, Turkey in 1960, South Vietnam in 1963, Bolivia in 1964, the Sudan in 1964, and Indonesia in 1966. But the list of governments that have successfully resisted student opposition in the same period is far longer, ranging from the constitutional democracy of Venezuela and the monarchies of Morocco and Iran to military regimes of the right and left in Algeria, Burma, South Vietnam, Argentina, Brazil, the Dominican Republic, Nicaragua, and Paraguay, to cite only a few. In the toppling of governments, including many that have fallen in the wake of student action, the central figure has been the army officer, not the student.

If the significance of student political activity should not be exaggerated, neither should its extent. On the average, about a third of the students in each of nine countries (Nigeria, India, Iran, Pakistan, Turkey,

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Argentina, Brazil, Colombia, and Panama) who answered comparable survey questions reported that they were very interested in politics. In Iran the proportion exceeded 50 percent, but only 15 percent of the respondents could be classified as "highly politicized" in their actual behavior. Other studies comparing student interest with political action show similar limitations on the size of the active group. In surveys conducted recently in Latin America, respondents who were very interested in student politics, compared to those reporting active participation in four or more strikes or demonstrations, were respectively: 41 and 12 percent in Paraguay, 20 and 8 percent in Colombia, 17 and 4 percent in Mexico, 21 and 3 percent in Puerto Rico.

A second danger lies in the deceptive radicalism of the most intense—and most widely reported—forms of student activism. Radicals are only a small minority of the student population in most developing countries, and are greatly overrepresented among those who believe students should play an active role in politics and who act on that belief in demonstrations and strikes. Such activities tend therefore to involve the tail ends of any given distribution of student opinion and not its central modes.

A third, subtler danger is the temptation to view students as isolates, as part of an international stratum of intellectuals rather than in the unique contexts of their national societies. Studenthood is everywhere a phase of academic learning, career preparation, and personal discovery in the transition from adolescence to adulthood. The university is everywhere a critical dynamic element of the process of modernization. Such generalizations, however, can be misleading: the personal experience and social meaning of studenthood are not the same in all cultures. This needs to be said with force because our present task is comparative, a search for the general rather than the extreme case.

Sex, age, and religion. One of the most consistent findings of contemporary political science is that men are on the whole more politicized than women. Students are no exception. In general, female students are politically less informed, less interested, and less active, and those who are politicized are less leftist, than their male counterparts. The explanation lies in the sheltered, passive, family-centered roles assigned to women in most developing nations.

The influence of age is less clear-cut. In parts of Latin America and Asia, prolonged student status is not uncommon and the "professional" student activist is definitely not a mythical figure. In 1963, Efren Capiz Villegas led a student revolt at the University of Morelia in Mexico; he had been a student for 17 of his 45 years. In 1960, Juan Campos Lama led a massive strike at the University of

San Marcos in Peru in his mid-thirties; he had been a student for 14 years. "Older, tougher, more ingenious, often seductively attractive," Shils has written from his Indian experience, "these 'professional' students are often catalysts who agitate lambs into lions." However, such cases do not characterize the broader community of student leaders. In Venezuela their age distribution is not out of line with the age curve of the student body as a whole. A study of University of San Carlos students in Guatemala found that leaders were on the average younger than non-leaders. The relationship of age (and class year) to student politicization is apparently mixed. On the one hand, older students with years of university experience behind them are more likely to hold positions of leadership in political groups; on the other hand, as students advance toward the prospect of employment, political interest and activity may give way to more career-centered concerns. Data from Argentina and Colombia suggest that political activity and leftist radicalism increase through roughly the first three years in the university, and then decline as the majority of students in terminal classes turn toward occupational concerns.

One factor influencing politicization is religious belief. The available survey data indicate that the more religious the student the less likely he is to be interested, active, or leftist in politics. In several of the countries studied, this negative relationship is statistically significant even when social background variables are controlled for. Given the historically conservative role of the Catholic Church and the anticlerical connotations of a leftist stance in politics in Latin America, the negative association between religiosity and leftist radicalism on that continent is not surprising. Neither the Church nor the left in Latin America is monolithic, however; in some countries the Catholic left or center-left parties and organizations have contributed a number of activists to student politics.

Given the close integration of Islam historically with nationalism and doctrinally with the realm of politics, one might expect this religion to play a different role in student politicization. Indeed, the role of the General Union of Algerian Muslim Students (UGEMA) in the Algerian revolution, and that of the Islamic Student Association (HMI)—the leading member of the Indonesian Students' Action Command (KAMI)—in the upheaval in Indonesia, suggest a positive correlation between religiosity and politicization. But the "Muslim" in UGEMA's name, and the street prayers of KAMI in Djakarta in 1966, were in part political tactics directed in both cases against leftist opponents. On campuses in other countries, politico-religious student organizations take still different forms. Yet in almost any African, Asian, or Latin American nation, university students as a group are more secularly inclined than the adult community, and student political leaders, although they may employ religious sym-

bols for political ends, are less devout than the student body as a whole.

The family. In general, and particularly in Asia, students residing in university housing, student hostels, or rented rooms are politically more active and more radical than those who live at home. This finding can be attributed to a sense of release from family constraints, to the disorienting effects of an urban environment, or to the increased opportunity for interaction with their peers. However, the mere fact of residence away from home is unlikely to play a decisive role in politicization; apathetic withdrawal, involvement in non-political campus cliques, or compulsive immersion in study are also possible outcomes.

The effect of family social status on student politicization is uncertain. Several studies have shown that upwardly mobile students tend to be more politicized than those from higher-status backgrounds. Evidence also exists for several countries suggesting that lower-status backgrounds are conducive to radical leftist views. But other investigations indicate the opposite: that upwardly mobile students are likely to be less politicized and less radical. Finally, there is also evidence that social status is not related to politicization or to radicalism.

The diversity of these findings is in part a result of diversity in research designs. In these studies, social status is variously specified according to father's occupation, income, or education. Sometimes these or other attributes are blended to form an index. Occasionally, the respondent's self-assigned position in a status hierarchy or along a "status satisfaction" scale is used. It should also be kept in mind that the distribution of parental status in virtually any representative sample of university students in a developing nation is skewed toward the middle or the upper end in comparison with the distribution of status in the adult population. "Lower status" in such samples usually tends to identify "lower-middle class" students rather than the children of poor peasants or unskilled workers. To the extent that educational opportunities expand, and "middle sectors" of society develop and widen, the skewness will decrease, as it already has in many countries. But for the upwardly mobile student, the relatively high status he acquires merely by successfully competing for entrance into a university is likely to blur the influence of his social origin on his political attitudes and activity. This is one reason why the power of strictly class-based analysis to explain student political behavior is so low.

The "contradictory" hypotheses are still there to be tested: that lower social origin leads to leftward politicization because the student is poor, disoriented, frustrated, and identifies more easily with

the deprived strata in society; or, on the contrary, that lower social origin leads to conservative or apolitical careerism because the student identifies with higher social strata whose ranks he has a longed-for chance to enter, because he lacks the economic margin to allow for "time wasted" in politics, and because radical political activity might endanger his career security. Similarly, higher social origins can be linked either to conservative or apolitical views or to a leftist, activist posture.

University variables. Understandably, the political potential of the student body at a large university in a capital city exceeds that of students enrolled in colleges in more isolated areas. In the capital, the students' proximity to government and opposition, their easy access to political information and commentary, and the ready availability of a national audience via the capital-centered communications media all tend to facilitate the task of the activist. The University of San Marcos in Peru, the Central University of Venezuela, and Seoul National University in Korea are among the many institutions that fit this pattern. Even in countries with large, dispersed systems of higher education such as China, Indonesia, and Japan, the centers of student upheaval are found in universities in capital cities. Exceptions to the rule are India and Pakistan. Elsewhere, notably in Africa, the nation's major university may be located near the capital in a self-enclosed "university city." This spatial insulation seems to have reinforced a certain apolitical elitism among many students.

Far more important than the university's location is the quality of university life. The relative absence of activism in sub-Saharan Africa, for example, is in part a reflection of this region's low student-population ratios. Student political activity tends to be disvalued in numerically restricted, proportionally elitist systems of higher education, in which the university graduate is virtually assured future employment. In contrast, in the university where underpaid, part-time professors lecture to anonymous crowds, where "education" means passing examinations and "learning" means cramming for them, where the student is unsupervised, unstimulated and, finally, unrewarded in his job prospect—under these conditions, student unrest is almost inevitable. This picture is exaggerated, but one or more of its elements can be found in many of the overexpanded, underdeveloped mass systems of higher education in Asia and Latin America today.

Exacerbating these conditions are the low output-input ratios found in many universities. Where students enter in waves and graduate in a trickle, education is not an orderly process but a log jam. Whether because of pressure from student representatives on university bodies, threatened demonstrations, or both, plans to

sacrifice quantity for quality are often very difficult to implement. In the blunt words of a professor in Peru: "I am now correcting exam papers, and at least half of these poor bastards deserve to fail. They don't know anything and they don't come to class. But if I failed them they would fire me. Believe me, I take a great risk in flunking 10 percent of my students, which few other professors would dare to do." Many an Asian professor could sympathize.

Evidence from 19 countries shows that, on the whole, students in the social sciences, law, and the humanities are more likely to be politicized and leftist than their colleagues in the natural and applied sciences. One possible explanation for this finding is that in the former set of faculties, political, social, and economic problems are actual subjects of study, unlike the latter. In the exact science faculties, the student is also likely to be under a somewhat more rigorous and demanding academic regimen, and his career prospect may look more secure. However, there is considerable international and institutional variation, and in any case the political reputation of a faculty may often rest on the reported views and actions of an activist minority rather than the actual distribution of student opinion.

Student politics and social change. Even if one could rank nations along some index of student activism—a delicate task indeed, given the methodological problems involved—it is unlikely that any strong correlations between quantitative levels of modernization (per capita income, for example) and student activism would emerge. The quality of a nation's modernizing experience, however, is a critical factor in student politics. In Algeria and Vietnam, where independence came only after long and violent struggle, national liberation was an intensely politicizing experience, personally for the students who fought under its banner and vicariously for those who looked on from abroad. In the tropical African countries that acquired their independence through a gradual transfer of power from the metropole, university students were comparatively much less politicized. In Thailand, Ethiopia, and Liberia, countries that have had no colonial experience to speak of, student activism has been almost non-existent. In general, the more tenacious the colonial regime, and the longer the struggle for freedom the greater its politicizing and radicalizing effects. In Latin America, however, the independence drive occurred so long ago that its effects on present-day student politics are purely symbolic.

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Student Alienation in Venezuela

Robert F. Arnove

[A survey of student opinions and activities at the Universidad de Oriente in eastern Venezuela focuses on the development of self-confidence and its relation to activism in both professional and political spheres. Political activism, though often disruptive in its local impact, was found to be positively related to professional self-confidence, to the more prestigious fields of study and to more optimistic and concrete images of the student's own future.]

Highly trained individuals who can enter key positions in government and industry are central to development. Yet technical competence is not enough; a distinct set of attitudes concerning the responsibilities of such roles and the commitment of professionals to their societies is also necessary. Unless university students develop such a commitment, and optimistic expectations about the efficacy of their actions, they may in later life remain marginal to rather than dynamic participants in social change. Recent surveys conducted on university student opinions and attitudes in several Latin American countries have indicated considerable student disaffection from present political regimes and uncertainty as to their future adult roles in society.

An experimental university in Venezuela founded in 1959, the Universidad de Oriente, was selected for an explanatory study of the ways in which a college social structure could influence student identification with and commitment to occupational and political roles. The problem selected for examination was alienation,

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defined here as a sense of low subjective competence, or powerlessness. The dimension of powerlessness was distinguished from other definitions of alienation which refer to estrangement and isolation or normlessness, characteristics of anomic behavior. Specifically, alienation was studied as student evaluations of their own competency to perform future occupational roles, and their expectations that their behavior would influence the probability of their success in those areas. Political alienation was viewed as an independent variable that would probably be associated with occupational alienation. Failure of a university to develop a student's sense of his efficacy in preparation for work, it was thought, would generalize to the student's evaluations of himself as a political actor.

The principal source of survey data was a questionnaire designed to measure the dependent and independent variables as well as gather information on background and related factors. The questionnaire was applied to a sample of nearly 900 students on the four regional campuses of the University of Oriente offering degree programs in 1968. At that time, approximately 2,800 students were enrolled in the University. The statements used to evaluate "efficacy" (and its opposite—alienation) were the following:

Professional Efficacy:

1. Influence is more important than my professional capacities in order to get a good job.
2. I don't have a clear idea of my future work.
3. Many people really don't understand what my profession is.
4. It will be difficult for me to get a job, because of the competition I am going to encounter.
5. Luck plays an important role in attaining my professional aspirations.

University Integration:

1. The students don't have effective means to make reforms within the University of Oriente.
2. It's not worthwhile trying to influence the University authorities, since nothing is going to change.
3. My vote has importance in the elections of the student center.
4. The University authorities don't take into account what people like me have to say.
5. When I have complaints about the University, I know what steps I ought to take.

Political Efficacy:

1. Through my activities I can influence the political process of the country.

2. Voting is an effective way to influence the political process of the country.
3. Sometimes politics and government seem so complicated that a person like me can't really understand what's going on.
4. People like me don't have anything to say about what the government does.
5. Politicians really aren't interested in the opinions of people like me.

The most "efficacious" students, as defined in this study, would respond negatively to the statements in the first series; negatively to 1, 2 and 4 and positively to 3 and 5 in the second series; and positively to the first two but not the last three in the third series.

The Students—Who Are They?

By contrast with student populations at other Venezuelan universities—and Latin American universities in general—the students at Oriente are predominantly from lower-middle and lower class backgrounds. A weighted index of family income, educational attainment, and occupational status of parents shows 33 percent to be unambiguously from families in the lower class, with the largest group (45 percent) from the marginal lower-middle class. Only one percent came from families with both college degrees and incomes over $1,000 per month. An overwhelming concern of these students is their precarious economic situation. Over two thirds believe economic problems could prevent them from completing their studies. They worry to a great extent over the sacrifices a university education causes their families. Even when a family does not contribute to the financial support of the student, university studies preclude his being employed and assisting his family.

Although living conditions are spartan and students are continually harassed by economic problems, there are also pleasant aspects to being a student in a place such as Cumaná. For many, particularly the girls, university studies represent their first independence from exceptionally strict family supervision. More importantly, these students enjoy a certain elite status. They are among the very few that successfully attain a university education—about 3 percent of those entering primary school in Venezuela. Although students at Oriente are principally from lower and lower-middle class origins, 87 percent of them evaluate themselves as belonging to the middle or professional class. Only 2 percent identify themselves as upper class, and 11 percent as lower or working class.

Students tend to be both optimistic and guarded about their future standard of living. Twenty-seven percent believe their standard of living five years after graduation will be much higher than their

family's present level. Sixty-one percent more cautiously expect it to be somewhat better. Another 12 percent expect their life style to be basically the same. The extent to which these students will be able to fulfill their aspirations depends on their success as students, as well as conditions prevailing in the society—and particularly in the economy. Thirty-seven percent believe their probabilities of finding a desirable job are good; another one third hedge by considering their chances to be fair. Twenty-seven percent are uncertain, but only a few (2 percent) are outright pessimistic about future life chances.

Principal Findings of the Study

1. Successful and satisfactory training experiences within the University are positively associated with a strong sense of professional efficacy. Students who interact with significant and rewarding professors, and who engage in professionally relevant tasks in the course of their studies, tend to have positive evaluations of their competency to perform future occupational roles. Few students, however, have a chance to participate in relevant occupational roles prior to graduation, as do medical students working in a clinic for example.

2. The prestige of a field of study is substantially associated with a feeling of professional efficacy. Students in the high prestige fields of medicine and engineering generally express more positive evaluations of their professional competency than do students in the less prestigious departments of sociology, animal husbandry, and biology. Students who believe their academic specialization to be prestigious tend to rank high on professional efficacy, even when they are actually located in low-prestige fields. (This university is technically oriented and has no degree programs in law, humanities, economics, architecture or journalism.)

3. The prestige of a field is negatively correlated with student-teacher interaction and satisfaction with reward systems. The higher the prestige of a field, the more dissatisfied students are with their academic environment—grades are highly competitive, and teachers are more distant. By contrast, low-prestige fields are supportive of students—good grades are more readily obtainable, teachers are accessible and encouraging. There is no department within the University of Oriente that is both highly supportive and prestigious.

4. Internal reward systems and student-teacher interaction patterns are greatly conditioned by the University's standing in the society and by future status the departments can offer. Students in less prestigious fields are satisfied within the supportive environments of their departments but uncertain as to what future awaits

them outside the University; students in more prestigious fields are dissatisfied with their academic environments but look forward with confidence to the attainment of esteemed statuses within Venezuelan society. (In general, the socializing impact of the University of Oriente is limited by its newness as an institution and by its location in the relatively backward eastern region.)

5. A sense of competency developed in the professional realm is positively associated with students' concepts of themselves as political actors. Professional and political efficacy are two independent but substantially interrelated variables, characterizing the individual who interacts with and manipulates his environment, is achievement oriented, and secure in his images of the future.

6. The politically competent student is likely to be a more active and democratic citizen. Students at the University of Oriente are generally interested in politics, and intense involvement with political roles is more typical of the efficacious student. He believes in the possibility of social change and is willing to agitate for reforms at the national and local levels as well as in the occupational realm. His militancy, however, may be narrowly sectarian and have disruptive consequences for the academic sphere.

7. Intense involvement in the political realm is associated with expressions of confidence and optimism. Contrary to the popular conception of the student activist, he is not significantly more dissatisfied with his academic environment; nor does he tend to be found in poorly defined career patterns that lead to uncertain futures (as other research suggests). The student who is getting ahead, and perceives a more promising future which may be blocked by imperfections in the society, is the one who takes action. The student who perceives his own failure and is blocked in his mobility aspirations tends to withdraw from the political arena. The alienated student is passive, fatalistic, and also more prone to violence.

Political Activism

Much of the discussion on student political behavior frequently mistakes student activism, whether in the United States or abroad, for manifestations of alienation. Student activism, however, may also be an expression of optimism regarding the possibility of change, which occurs in periods of upheaval or rapid social mobilization. Similarly, student radicalism may accord with prevailing social conditions, and with widely held expectations that students will criticize social injustices and on occasion take direct action. In Latin America, the tradition of student political involvement is strong. Students in Venezuela are likely to have participated in some form of protest activity from high school on, taken part in school elections where

student tickets represent national political parties, or played a role in campaign activities in a national election year.

Student responses to the questions on political efficacy (shown above) were combined in a Political Efficacy Scale, which compares students' subjective feelings and judgments of themselves as political actors. In addition, an index of actual student political participation and interest was constructed with nine items: 1) leadership position in a student organization, 2) membership in a national or university-based political party, 3) interest in the 1968 student center elections, 4) participation in the campaign of a student party to gain control of the student center, 5) participation in student protest, 6) frequency of discussion of student politics, 7) frequency of discussion of national politics, 8) interest in the forthcoming 1968 national elections, and 9) participation in the electoral campaign of a political party. High scores on the activism index were given to 35 percent of the students while 31 percent scored low. Comparing student scores on this index with their positions on the Political Efficacy Scale, a strong positive association is observed. Forty-seven percent of the politically efficacious score high on the index of activism, compared with only 11 percent of the alienated. Individual correlations between each of the items on the index and political efficacy confirm the above finding.

The politically confident have an overriding concern with the country's welfare. They are apt to daydream about Venezuela, elaborating plans to solve its problems; 36 percent of the high efficacy group often engage in such mental flights, compared with 15 percent of the alienated group. The politically competent are more likely to anticipate acting as professionals to improve unfavorable work conditions. Students were asked the following question: "Suppose that as a future professional you accept a job and encounter irregularities and work conditions that are contrary to the best exercise of your profession. Moreover, let's suppose that your colleagues are willing to take steps to protest, although the authorities of the institution might take reprisals against you. What would you do?" The politically efficacious are more emphatic about their willingness to act; 73 percent state they "definitely would" join their colleagues in protesting to authorities, while 53 percent of the alienated support this course of action.

Student evaluations of various aspects of the political system were approached through open-ended questions. Responses were coded according to whether their frame of reference was positive, negative, or neutral and analytical. For example, students completed the following sentence: "The majority of politicians in this country are _____." A typical negative response might be: "They are interested only in their own self-enrichment." An extremely negative comment, not uncommon, was: "Politicians are swine," or "para-

sites," or "vermin," etc. Over 90 percent evaluated politicians negatively. In part, these negative findings may be attributable to the structure of the question, perhaps forcing a negative response. (It would be interesting to see if North American university students would be as critical of their political leaders.) The item nonetheless shows that the high efficacy students are somewhat more negative—93 percent compared with 86 percent of the low efficacy group. Evaluating the efforts of the present government to resolve development problems of the country, 40 percent of the high efficacy group is extremely critical, compared with 28 percent of the low efficacy group. But while they are more demanding of the government's performance, the subjectively competent are also more analytical in their responses—17 percent evaluate the government in terms of the many problems confronting it, compared with only 10 percent of the alienated. When asked whether any political group or ideology could do more for the country than the present government, about half the student sample made no response. Of those who responded, fewer of the politically efficacious offered a negative or pessimistic remark such as "No group is worthwhile," or "All political parties are the same." About twice as frequently as the alienated, efficacious students either mentioned one of the legal opposition parties, or referred to Marxism or leftist ideology in general.

A particularly interesting finding was that in spite of their general disillusionment with major aspects of the political system, the subjectively competent are less prone to violence and anomic behavior than are the alienated. In response to two questionnaire items, fewer efficacious students agree with the statements that: 1) "Violence is needed to change the political situation in the country," and 2) "When people disagree with a government, they should disobey it." On the first item, 56 percent of the politically efficacious agree with the statement supporting the use of violence, compared with 69 percent of the low efficacy group. On the other item, 39 percent believe the public is sometimes justified in disobeying a government, with 50 percent of the alienated in agreement with the statement. In general it would appear that civic norms are imperfectly crystallized, since as many as 60 percent of the students in the total sample give responses that support violence either strongly or "more or less."

The politically efficacious as "cosmopolitans." At the University of Oriente, marginal to the main political currents emanating from Caracas and the central region of Venezuela, the politically efficacious serve as interpreters of national politics. They tend to view student politics to a far greater extent than do others in terms of the national political scene. Twice as many of the high efficacy group (44 percent to 22 percent of the alienated) believe that student leaders should be influenced in their decisions by political affiliations outside the University. Because of these views, the politically effica-

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cious are more apt to introduce both a partisan and a disruptive note into the academic arena. Although most students are willing to militate in order to improve academic conditions and student services within the University of Oriente, fewer would support a strike for purely partisan political reasons (33 percent of the politically efficacious, compared with 21 percent of the alienated). In the University environment, where opposition to the "establishment" is inveterate, this cosmopolitanism of the politically efficacious students is more likely to lead to identification with opposition groups than with the government. In the University elections to student centers, for example, left wing candidates were far more often successful than in national elections.

Biographical variables. Urban backgrounds, and migration from other regions to Oriente, are associated with a highly developed sense of political efficacy. A distinction arises between students who have lived in cities larger than 50,000 for most of their lives and those from small towns or rural areas. Forty-three percent of the students from such cities score high on political efficacy, compared with 28 percent from less urban areas. Students from the two largest cities of Venezuela, Caracas and Maracaibo, are the least likely to be alienated; only 13 percent of the students from these metropolises place in the alienated category; 31 percent of students from rural areas feel politically powerless.

Findings in Oriente confirm the usual tendency for males to be more politically confident and active than females, as well as for nationals to be more politically involved than foreign-born. Sex differences are more striking on the index of participation and interest; female scores probably reflect expectations that they will not engage in the rough and tumble of politics. On the other hand, belief in the efficacy of the vote and their potential power as citizens and educated elites lead to higher female scores on the measure of political efficacy than on the index of activism.

The survey tends to corroborate indirectly the political powerlessness of lower-class citizens, whose position in the social hierarchy and lack of resources (including interaction skills, political knowledge, and finances) are likely to bar active participation in the political decision-making process. In this research, there is only a slight tendency for the middle- to upper-class students to be more politically efficacious, small differences that might be attributed to upper-class students coming from predominantly urban areas. More significant is the finding that the overall increase in political efficacy at the University between students in the first basic courses and those in the second cycle of professional schools is largely accounted for by students from lower-middle and lower-class backgrounds. As students from the lower strata become increasingly integrated into

the University milieu, they appear to gradually assume many of the characteristics of individuals from elite backgrounds; they also more confidently assume the political roles society expects them to play. Whereas the upper two strata actually drop in political efficacy and the middle stratum increases by 5 percent, the lower two strata combined increase by more than 10 percent—the lower-middle class by 13 percent and the lower class by 8 percent.

Professional efficacy. Much of the literature on university student agitation presumes that students are dissatisfied with their educational environments and uncertain regarding their future positions in society. Researchers such as Lipset, Pinner, and Scott have pointed to the high occurrence of activism among students in humanities and social sciences, fields whose subject matter and career patterns are not clearly defined; these students are contrasted with those of scientific and professional disciplines, which offer well-organized training programs and lead to secure statuses in society. Confronting an uncertain future, the former students may participate in radical movements aimed at improving their position. The data from Oriente, however, indicate that professional efficacy is positively correlated with political efficacy. Nearly twice as many students who are high on professional efficacy rank high on political efficacy. Forty-six percent of the students who feel confident about their future professional roles also feel politically competent, compared with 25 percent of the low efficacy group. Only 10 percent of the high professional group feel politically powerless.

To see whether this correlation of subjective attitudes corresponds to similar relations among social realities, the decision was made to test the relationship between the prestige of a field—a good indicator of the clarity and status of a career in Venezuelan society—and actual student involvement in politics. Earlier studies suggested that there would be a negative correlation—the lower the prestige of a field, the greater the likelihood that students would be active. Our findings, however, go in the opposite direction. The higher the prestige of a field, the higher is the level of political participation and interest. Thirty-five percent of the students in the prestigious fields of medicine and engineering score high on political activism, compared with 24 percent of the low-prestige departments of biology, sociology, and animal husbandry. In part, these positive findings may be a result of the militancy of medical students, which is traditional in Latin countries. Lipset draws our attention to this phenomenon, which is "uncommon in the United States, most of northern Europe and the anglophonic world." He writes: "In the Catholic world, this orientation stems from the historic conflict between science and the church, a tension relatively absent from the politics of most Protestant countries." However, it still remains difficult to explain the militancy of students in the different branches of engi-

neering, a discipline seldom associated with student radicalism either in Latin America or the United States. Moreover, why should sociology students, whose field is specifically related to social problems and issues, collectively score low on the index of political participation and interest?

Several attempts to relate political activism to university variables, including relevance of the subject matter of a field of study to the political system, produced weak and inconclusive relationships. With respect to socio-economic status, it appears that status of origin (parents' position) is less influential than "status of destination," that is, political activism tends to be greater among students who foresee significant improvement in their future and who are less fearful of the obstacles to their graduating and getting a good job. As a general explanation of these combined results, we argue that a sense of subjective competence, whether expressed in the political-critic or professional-trainee role, tends to be highly associated with achievement norms, with active involvement in the environment, and an optimistic outlook on future life chances. In our sample, both political and professional efficacy are systematically associated with higher levels of activism. Seventy-nine percent of the overall efficacious students (i.e., those who rank high on both the professional and political efficacy scales) also rank high on activism, compatred with only 13 percent of the most alienated students (low on both scales). The optimism of the generally confident and efficacious students is anchored in definite images of the positions they will occupy in the industrial economy. By contrast, alienated individuals are characterized by a lack of both achievement norms and concreteness over their future place in the social order.

[Excerpted from Student Alienation: A Venezuelan Study. New York: Praeger Publishers, 1971, pp. 3-4, 9, 21, 26, 28-29, 90-106, 110-111, 130-131, 139-142, and 167-169. Copyright © 1971 by Praeger Publishers, Inc. Reprinted with Permission.]

The Political Socialization of University Students in Ghana, Tanzania, and Uganda

Joel D. Barkan

[University students in Africa have been less active politically than in Asia or Latin America; this is related to their early parochial environments, their anticipated positions after graduation, and to the values they have absorbed from their experiences in secondary school. Student views on political authority and legitimacy were surveyed in three African universities.]

When one looks to sub-Saharan Africa for examples of sustained student unrest, there are few to be found. Although student demonstrations have occurred in recent years, all but one can be regarded as isolated incidents. During 1964-69, student demonstrations took place in eight African states—Congo, Ethiopia, Ghana, Kenya, Senegal, Sudan, Tanzania, and Uganda. But only in Ethiopia did these demonstrations involve a challenge by students to the authority of the political regime, or a confrontation lasting more than three to five weeks. Nor have most students been regular participants in the less dramatic forms of political life. For example, over 80 percent of the students surveyed for this study said that they were not members of a political party. A similar percentage reported that they had never tried to influence the government of their country by engaging in activities other than demonstrations. Almost 60 percent said they did not discuss matters of government and public affairs more than once a month, though 95 percent read a newspaper daily and are thus aware of major political issues as they arise.

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It should also be noted than when student involvement in politics has occurred, it has been relatively lacking in either ideology or idealism—two characteristics which have been hallmarks of student activism elsewhere in the world. Student participation in politics has been largely a sporadic and pragmatic exercise, motivated by individual self-interest and concerned with one or two specific issues. Typical issues behind student disturbances have included cuts in scholarships (Senegal, 1968), living conditions in the university (Kenya, 1964), suspension of students by university authorities (Ghana, 1968), and compulsory service by students to nation (Tanzania, 1968, Ethiopia, 1969).

The limited role which African university students play in the political arena is primarily a function of their social position as a scarce resource of highly trained manpower on an underdeveloped continent. Because job recruitment in Africa is inextricably linked to educational achievement, university students can anticipate careers which are closed to all but a handful of their fellow citizens. By expecting to become secondary school teachers, civil servants, doctors and other types of professionals, most students anticipate a high standard of living coupled with substantial job security at the completion of their studies. By choosing to enter the careers they do, and desiring the style of life such careers confer, the overwhelming majority of African university students are content to leave to others the control of the political arena. This does not mean that students hold those who do control the political arena in high esteem; indeed they do not. As aspiring technocrats, however, most students expect to advise and implement the policies of others, rather than feeling responsible for the formulation of policy themselves or getting involved in efforts to challenge the political elite. By providing university graduates with a secure niche in the establishment, the political elite both undermine the potential opposition of students, and enhance the possibilities of their policies being carried out.

If this is the role which most students have conceived for themselves in the modern sector of African society, what has been the process of socialization through which students have come to regard this role as a legitimate one for them? What conceptions of the political system have students adopted? In what ways have variations in the socialization process affected student conceptions of the political system, and their propensity to engage in various forms of political activity? I will attempt to answer these questions on the basis of data obtained from surveys of university students in Ghana, Tanzania, and Uganda.

Socialization in the African Context

The process of political socialization in Africa is substantially different from that found in the more developed regions. Divided by

tribe and religion, and rooted to a small geographic area by their dependence on an agricultural economy, most Africans are socialized first to the parochial or traditional culture of their immediate environment. Socialization to a national political order, if it takes place at all, is more appropriately characterized as resocialization, for it involves a transfer of loyalty from the tribal society to that of the nation and the learning of new skills. Not only must new values and role expectations be learned, but old, and often contradictory standards must be displaced. Such a confrontation of norms often results in resistance, or reinterpretations, so that the learning of new roles is not always smooth or complete.

The political resocialization of the young African is also more difficult because the institutions which wish to reorient his values have limited resources to command. Penetration of the population by the mass media is low. Though newspapers are published in almost all African cities of significant size, their circulation is largely confined to the urban areas in which they appear; in any case there is widespread illiteracy. While the transistor radio is a common sight, it is far from a universal phenomenon, especially in rural areas. In addition, the educational systems of most African states are incapable of mounting an effective program of political education for the younger members of their societies, since the overwhelming majority of the population does not attend school long enough for effective socialization to take place. On the average, less than 50 percent of the children eligible to attend school at the elementary level actually do, while less than 10 percent continue past the sixth grade, and less than 2 percent receive a complete secondary education. In general, the elementary school teachers are poorly trained, and few teachers are willing to spend much time on citizenship training. The success of their own careers depends on the ability of their students to pass the standardized examination which the Ministry of Education gives each year; because these exams do not emphasize a knowledge of government and the political system, little classroom time is devoted to these subjects. Finally, the student body at most elementary schools is drawn from one tribe, and in missionary schools predominantly from one religious group. The environment of the elementary school is thus a highly parochial one, little different from the milieu into which most Africans are born.

By the time the child reaches the equivalent of eighth grade at age 14, the socialization of the young African to the national political culture has only just begun. It cannot commence until the person begins to interact with institutions of the national social order. There are three ways in which such interaction might take place on a sufficiently continuous and intensive basis to engender a transfer of loyalty to the national political system. One involves extensive participation in the activities of an aggressively nationalist political

party. A second is to emigrate to an urban area where one can interact with a number of institutions which cater to groups drawn from across the nation. The third, and undoubtedly the best way to become socialized to the "modern" sector of the nation, is to attend school at the post-elementary school level. All three of these routes require that the individual be at least in his teens.

The Socialization of African University Students

Though the typical university student has interacted with various institutions at different times, none—with the possible exception of his family—has monopolized his time on a continuous basis to the degree of the secondary school. During the six years prior to university entrance the student has usually attended a boarding school, with the result that he has been substantially isolated from the other institutions which shape the life of most of his fellow citizens. Because the educational system is virtually the sole avenue of social mobility in Africa, the student is more receptive to the values espoused by this institution than others. His dependence on the school as the key to his future livelihood is such that he will do almost anything the system demands. The university student has consequently been strongly exposed to some of the norms of a modern society, but in a specialized setting which has its limitations. The student is essentially a product of a school environment that had its roots in the colonial era.

Ghana, Tanzania, and Uganda have educational systems which are remarkably alike, both in structure and procedures and in the values they espouse. Each is essentially an elitist system, as the percentage of students who pass through all levels is exceptionally small. Because advancement within these systems is almost entirely dependent on the student's performance in standardized examinations, learning by rote is the most typical method of instruction. Consistent with these patterns has been a long-standing emphasis on obedience, thriftiness, diligence and honesty. The qualities of leadership, initiative, and the ability to be critical have not been stressed. For the most part, the educational systems in most of ex-British Africa are thus conservative institutions which have tended to produce well-trained, conservative men. Rather than being socialized to the idea that they might govern the polity, most students have been primarily imbued with the idea of serving it. When the students in the survey for this study were asked to pick three adjectives from a list of 17 which best described themselves, the respondents in all three countries chose "intelligent," "reliable," and "honest"—the same adjectives they picked to describe a permanent secretary in their countries' civil services. In contrast, students described leading African political figures as "intelligent," "courageous," "wise," and "dynamic."

Given this orientation, it is not surprising that few students wish to embark on such entrepreneurial careers as business or politics. Reliability is a prized value; power is not. Such values were suitable in the administrative state of the colonial order, but their congruency with the political order of the post-independence era has not always been so clear. In Ghana during the Nkrumah era, and more recently in Tanzania, the elitist, albeit apolitical orientations of university students have come under severe rebuke. The educational systems in both countries, particularly at the university level, have come under sharp scrutiny in the period since independence on the grounds that they have been dysfunctional to the creation of the desired national political culture. In Ghana, the issue was resolved by the military coup which overthrew the Nkrumah regime in 1966. In contrast, Tanzania has adopted the more difficult alternative of changing the nature of the educational system.

The Surveys

The data for this analysis come from surveys which the author conducted between November, 1966 and December, 1967 in Uganda at Makerere University College; in Tanzania at the University College, Dar es Salaam; and in Ghana at the University of Ghana, Legon. At each institution a random sample of the entire student body was requested to fill out a self-administered questionnaire. Response rates were 63, 54, and 75 percent respectively. The respondents at each campus closely resemble the entire student body at the time of the survey: in terms of sex, age, ethnic background, religious affiliation, and course of study, the percentage of respondents at the three schools in any one category of these variables is never more than three percentage points off the percentage for the student body as a whole.

The response rates correlate with the amount of political pressure the students of each country felt themselves to be under at the time they were queried. At the University College, Dar es Salaam, 46 percent of the Tanzanian students had been dismissed in October, 1966, for vociferously protesting against their inclusion in the government's program of National Service. As a result, many students were wary of expressing their opinions at the time of the survey in August, 1967, even though all but eight of those dismissed from the university had been readmitted for the 1967/68 academic year. In Uganda, where the survey was held six months after the Uganda army had stormed the Kabaka's palace in May, 1966, many students were anxious about the future of the country and their own status. In contrast, Ghanaian students experienced no pressure from the political arena at the time of the survey there; after 20 months of military rule, the hostility borne by the university community during Nkrumah's last years had receded to the background of most

students' minds. In general, most students seemed very candid in their replies to the questions asked. For example, 43 precent of the Tanzanian respondents acknowledged participation in the anti-government student campaign against National Service, a figure only 3 percent less than the actual rate for all Tanzanian students at the College. (It should be noted that while the political socialization of university students is a major concern of this writer, it was not the central theme around which this survey was designed. Its main purpose was to determine the role which African university students intend to play in their countries after finishing their studies.)

Student Conceptions of the Political System

To determine the type of political system students desire, the three samples were asked a series of questions about their conceptions of authority and legitimacy. As used here, authority is viewed as a function of who should wield power, while legitimacy is seen as a function of how power should be obtained and used. In respect to both dimensions, the respondents were presented with four statements to which they were asked to agree or disagree with five degrees of emphasis ranging from "strongly agree" to "strongly disagree."

Statements on authority were as follows: 1) "The best form of government is that run by those who are the most educated." 2) "Because they are specialists, the civil servants in my country would usually know more about the country's problems than would a Member of Parliament." 3) "All M. P.'s should be experts on at least one problem confronting their country before being allowed to stand for office." 4) "The government of a country should do what is best for the people even though it may not be what they want." Responses to these statements were classified as technocratic if the respondent "strongly agreed" or "agreed" with the propositions. Depending on the number of propositions on which the respondent viewed authority as a function of expertise, he was assigned a score of 0 to 4; 4 is the most technocratic, 0 the least. The distributions of the three samples on this index are given in Table 1A.

A similar index was created for the concept of legitimacy, using statements focused on some principles commonly adhered to in democratic political systems. The statements on legitimacy were as follows: 1) "The majority of the people usually know what is best for their country." 2) "Any political party should be allowed to organize, hold rallies, and express its views so long as it obeys the law." 3) "Freedom of speech must sometimes be limited in the interests of security and good government." 4) "The authority of a Member of Parliament is greater than the authority of a civil servant, because the former is elected by the people." Responses to these statements were classified as democratic if the respondent "strongly agreed" or

"agreed" with statements 1 and 4, "strongly agreed" with statement 2, and "strongly disagreed" or "disagreed" with statement 3. The distribution for this index is given in Table 1B; 4 is the most democratic, 0 the least.

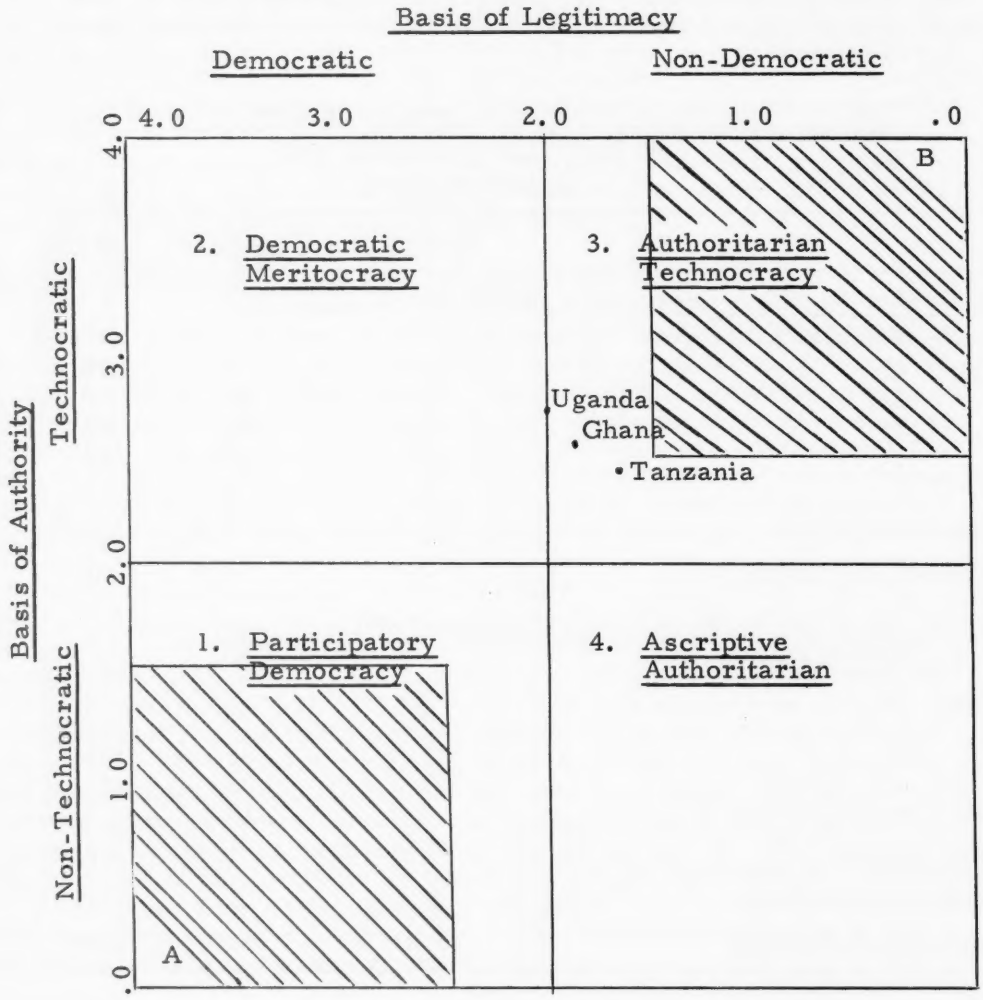
Table 1: Indices of Student Responses on Questions on Authority and Legitimacy

(in percentages)

	Ghana	Tanzania	Uganda
A: Degree to which Respondent Conceived of Authority in Technocratic Terms			
High: 4:	20	23	25
3:	39	29	35
2:	27	28	28
1:	13	15	12
Low: 0:	1	5	1
Mean Score:	2.6	2.5	2.7
Standard Deviation:	1.0	1.1	1.0
B: Degree to which Respondent Conceived of Legitimacy in Democratic Terms			
High: 4:	3	2	4
3:	22	17	16
2:	43	36	39
1:	27	35	31
Low: 0:	5	10	9
Mean Score:	1.9	1.7	2.0
Standard Deviation:	.9	1.0	1.3
Numbers of Students	(582)	(400)	(269)

As the table shows, the distribution of cases on each index is fairly broad and approaches that of a normal curve, particularly on the index of legitimacy. As indicated by the mean scores, none of the three groups is strongly democratic or anti-democratic in their conceptions of what rules should govern the running of the polity. In respect to student conceptions of authority, however, there is a clear preference for power to be vested in the hands of the expert. These index values for student conceptions of authority and legitimacy can be combined to yield a four-fold typology of political systems, as illustrated by Figure 1. 1) Students who subscribed to a democratic concept of legitimacy, but a non-technocratic concept of

Figure 1: A Typology of Political Systems



authority can be considered as preferring a democratic polity in which the degree of participation by the average citizen in the decision-making process is fairly high. The most extreme form of such a polity would be the direct democracy of the small New England town which would be found near Point A. 2) Those who subscribed to a democratic concept of legitimacy, but who thought that authority should be predominantly vested in the hands of experts, can be classified as desiring a form of democratic meritocracy. 3) In contrast, students who conceived of authority in technocratic terms but who did not subscribe to a democratic concept of legitimacy, can be classified as desiring

an authoritarian political system in which men of expertise would wield power with few or no checks on the decisions they make. An extreme form of such a polity would be a totalitarian one which would be plotted at point B. 4) An ascriptive authoritarian system is one where power would be rightfully exercised by men with no special skills in the art of government, but who obtained their positions on the basis of traditional or ascriptive criteria. (These types of polity should not be considered as mutually exclusive, nor as homogeneous in their features.) Plotting the mean scores for each sample which were presented in Table 1, we find that the average student in all three countries will opt for a type of political system that represents a mild version of authoritarian technocracy.

Because the points on Figure 1 are averages only, one must be careful not to overemphasize the extent to which students conceive of the political system in the same way. Though a scattergram for each sample would have yielded the same general finding, the broad distributions on each index, and the moderately large standard deviations which these distributions produced, indicate that there are a substantial number of students who do not fit the modal pattern presented on the graph. Nevertheless, it is significant that the results for the three country samples were virtually the same. This similarity of results is typical for much of the data collected in the three countries; it is another manifestation of the degree to which students who have shared a similar educational experience express similar opinions, despite the different cultures and political systems from which they come. For the same reason, students with different social backgrounds from the same country express similar patterns of response as well. In respect to student conceptions of the political system, we find that such variables as sex, class, religion and tribe do not alter student attitudes in any significant way. In short, it would seem that, to some degree, students have been homogenized by their common experience in the educational system.

Comparison of Strongly Contrasting Groups

A comparison of students favoring diametrically opposed polities makes it possible to isolate the impact of some aspects of their socialization experiences in forming conceptions of what constitutes the proper political order. Cases were selected from the total samples to identify students classified as clearly preferring a participatory democracy, and those classified as clearly desiring an authoritarian technocracy. The comparison was restricted to these two sub-samples, because those who prefer a democratic polity provide the sharpest contrast to those who prefer the most popular system of "authoritarian technocracy." The respondents falling under each heading come from the lower left and the upper right hand corners, i.e., the shaded areas, of Figure 1. In each country the two more

extreme groups represented about one quarter of the total sample, and the ratio of students preferring an "authoritarian technocracy" to those preferring a democratic regime is 2:1 or more.

Examining the types of students who fall under these two headings, one finds no significant differences resulting from their different social backgrounds. They are, however, affected by their level of involvement in different types of activities. Student conceptions of the political system in the two contrasting groups were found to vary with two types of activity—the discussion of matters of government and public affairs with the student's family, and the student's participation in such discussions at the university which he attends. As shown in Table 2, the respondents who desire a "participatory democracy" (P. D.) contained a greater percentage of students who had been frequent participants in family political discussions than the percentage for those who opted for an "authoritarian technocracy (A. T.).

Table 2: Factors Influencing Students Who Clearly Prefer Participatory Democracy (P. D.) or Authoritarian Technocracy (A. T.)

(in percentages)

	Ghana		Tanzania		Uganda	
	P. D.	A. T.	P. D.	A. T.	P. D.	A. T.
A: Level of Participation in Family Discussions of Matters of Government and Public Affairs						
High:	23	14	33	11	29	17
Medium:	41	44	20	26	47	43
Low:	36	42	48	63	24	40
Numbers of Students	(56)	(101)	(30)	(73)	(17)	(60)
Significance:	.25		.04		.33	
B: Level of Participation in Discussions at University						
High:	63	40	55	32	44	23
Medium:	13	12	3	7	19	15
Low:	25	48	41	61	37	62
Numbers of Students	(56)	(100)	(29)	(71)	(16)	(60)
Significance:	.01		.10		.19	

Tests of significance are based on chi-square.

This pattern is found in all three samples. It is paralleled by a similar relationship between student concepts of the polity and their level of participation in political discussions at the university. The strength

of this second relationship is more pronounced, suggesting that the conceptions students hold of the political system is more a function of their involvement in these current discussions than those which took place at home. Whereas in Table 2A the average difference between students desiring an "authoritarian technocracy" and those desiring a democratic regime is 13 percentage points for the "high" and "low" categories, in Table 2B the average difference is 22.

The relationship between different conceptions of the political system and the actual political participation by students is not as strong as one might expect. Students preferring a participatory democracy are more likely to have voted in a parliamentary election than those favoring an authoritarian technocracy. As shown by Table 3, however, this relationship is not found in the Tanzanian sample, and is not very strong in Uganda. It is worth noting, however, that students who prefer a "participatory democracy" were somewhat more likely to express positive feelings about having voted in elections; when asked about the feelings they experienced when voting, the students who preferred an "authoritarian technocracy" were the ones more likely to express feelings of indifference.

Table 3: Has Student Voted in a Parliamentary Election?

(in percentages)

	Ghana		Tanzania		Uganda	
	P. D.	A. T.	P. D.	A. T.	P. D.	A. T.
Yes	29	9	43	46	59	39
No	71	91	57	54	41	61
Numbers of Students	(55)	(100)	(30)	(72)	(17)	(59)
Significance:	.002		.98		.23	

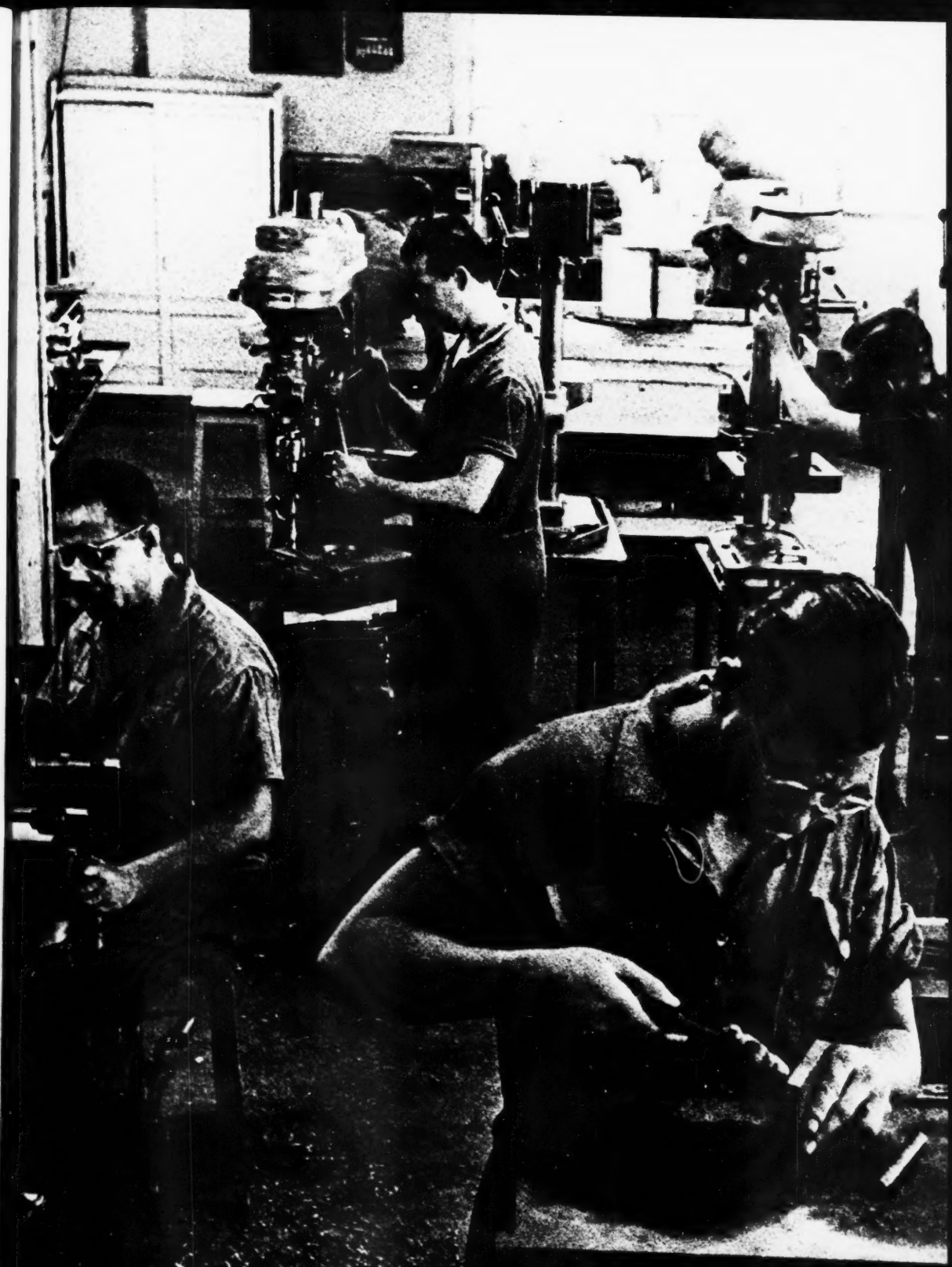
Conclusion

If, as our data have suggested, the educational system is the most powerful agent of socialization with which students interact, then we must pay increased attention to the role the educational system plays in nation-building and social change. If these processes are merely defined as inducting Africans into a national political order, then there can be little doubt that the kind of socialization that African university students have undergone has contributed to the realization of this goal. For the most part, African university students are prepared to serve and join the existing establishments in their countries. In so doing, they consolidate the power of the establishment, and enhance its ability to deal with the problems of its

society. But if, in addition to this meaning, nation-building means the development of a new political culture that is substantially different from that experienced in the past, the value of the socialization experience which most students undergo is not so clear. As noted earlier, most students expect to embark on technocratic careers, and become members of an upper-middle class; our data indicate, moreover, that more students prefer a technocratic political system with authoritarian overtones than any other. While this outlook is consistent with the views of many African regimes, it is not with others.

Where the regime has merely sought to Africanize the administrative apparatus of the previous colonial order, and has not sought to politicize the civil service by merging it with a nationalist political party, few conflicts have arisen. On the other hand, where the regime has attempted to restructure the society, and especially when it does so by curtailing the privileges of the educated class, there has been considerable tension. The crisis over National Service in Tanzania is a case in point; having been told for years that they would receive the benefits of an upper-middle class at the completion of their studies, students revolted against a regime which they overwhelmingly admired when these benefits were even temporarily withdrawn. Where the educational system plays the greatest part in the socialization of the educated class, and this class is the source of trained manpower with which the new states of Africa hope to build their nations, it cannot become permanently alienated from the regime it serves. The question of consistency between the norms and role expectations espoused by the educational system and those demanded by the political regime is thus a serious one.

[Excerpted from "The Political Socialization of University Students in Ghana, Tanzania, and Uganda," a paper presented at the Sixty-Fifth Annual Meeting of The American Political Science Association, New York, September 2-6, 1969.]



MAINTENANCE AND REPAIR

MACHINE SHOP IN THE INTERNATIONAL BUSINESS MACHINE TRADE CORPORATION FACTORY AT RIO DE JANEIRO, BRAZIL. [PHOTO: IBM TRADE CORPORATION]

A Strategy for Promoting Maintenance and Repair

B. N. Bhattasali

[Inadequate attention to maintenance and repair of industrial equipment in developing countries calls for: first, a promotional drive to focus attention on the subject and create follow-up organizations; and second, a planned strategy to introduce appropriate, cost-related maintenance practices in firms where the largest pay-off can be demonstrated.]

In general, most developing countries have to import their capital equipment—plant, machinery, appliances and their spare parts. Almost all of them lack capital. Whatever liquid capital they may be able to mobilize is not readily convertible into foreign currencies because of their trade deficits and unfavorable balance-of-payment positions. In spite of such handicaps, the industrialization of developing countries obviously must proceed. In the developing countries capital equipment could be used substantially longer than it is in the industrial countries through care in—labor intensive—maintenance and repair. But this can be properly realized only if satisfactory systems of maintenance and repair can be organized, and manpower trained to operate them.

Some of the most prominent features of the maintenance and repair services in most developing countries are the following:

a. Although the need for maintenance and repair in the developing countries in both quantity and

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quality is by far greater than in the developed countries, services in this field are completely unorganized.

b. The workers, supervisors and managers do not always have the requisite skills to operate and maintain modern equipment properly, with the result that the machinery breaks down more frequently.

c. Most of the developing countries import capital equipment. They are unable to keep an adequate supply of spares on hand, and this causes serious economic losses through shutdowns.

d. Many developing countries buy their equipment in different countries with different sets of standards and specifications. It is often difficult to provide proper technical facilities and skilled manpower to cater for the maintenance and repair of such heterogenous equipment.

e. The consumption of industrial equipment and spares is limited. In the absence of the benefits of economies of scale, it is difficult for the suppliers to provide facilities for major repairs or after-sale service. The consumer cannot always make proper arrangements for major repairs locally, nor undertake indigenous manufacture of spares—which means more dislocation and interruption in production.

All these factors contribute to a substantial increase in costs for the industries of the developing countries. These costs could be reduced by introducing and operating appropriate systems of maintenance and repair. The additional costs thereby incurred would be only a small fraction of the total losses that would result from interruptions in production and shutdowns.

Promoting the Concept of Maintenance and Repair

Maintenance and repair services have been known and provided in almost all societies in some form or other from the remotest days of antiquity. What is new is that they are considered today from a scientific point of view with respect to both planning and organization and in terms of rapidly advancing technologies. In most developing countries, there are sufficient published materials available on maintenance and repair services. Yet interest in this subject has not been aroused. Some sort of shock treatment to make people "wake up" to the importance of repair and maintenance may be necessary.

The deplorable state of maintenance and repair in a developing country could be dramatized if the Finance Minister, Minister for

Industry of even the leader of the opposition were to issue a stern warning to the public that the country is losing so many million rupees, pounds or dollars every year because of failure to operate proper systems of maintenance and repair. Data for this could be gathered through work sampling and scrutiny of past records on interruptions and stoppages of work in a few representative factories.

When the political leader creates a public sensation with his indignant statement about the losses the country is suffering through inadequate maintenance and repair, he should also be able to present a broad outline of the solution to the problem. He may urge the establishment of a national association of managers, engineers and scientists to provide the country with the necessary leadership and guidance in the field of maintenance and repair. It would be desirable if he could announce a grant for setting up a national institution or at least for adding a new department to an existing national institution in the field of engineering or management. He may also wish to announce that a national conference or a seminar of top technocrats to study ways to organize maintenance and repair services at the industry, regional and enterprise levels will be convened, and that a few national awards will be made annually for contribution towards the improvement of maintenance and repair by engineers, scientists, managers and workers.

When preparations are being made to convene the national conference, it must be ensured that the participants represent various industries, the geographical areas where sizable engineering and manufacturing works are carried out or are to be carried out, including managers, scientists, engineers, trade unionists, manufacturers or importers of capital goods and spare parts, etc. Such a national conference should produce some specific plans and recommendations for setting up organizations at the industry, regional and enterprise levels, and subcommittees to follow up these recommendations systematically, reporting results to the national organization at periodic intervals. It would be very useful if this conference should decide to publish a quarterly, if not a monthly, journal on repair and maintenance under the auspices of the national organization that would disseminate relevant information at home and abroad, publish important contributions by the technocrats on the subject, and report progress on the various aspects of the movement at the national, industry, regional and enterprise levels.

That governmental support is provided for maintenance and repair services or that some public funds are used for this purpose should not be construed to mean that responsibility for introducing and operating such services rests with the government. Nothing could be further from the truth. But few of the developing countries have organizations of technocrats that could stand on their own feet

without government support. Government support is therefore not only necessary but also desirable to ensure smooth functioning and broad acceptance of maintenance and repair systems at different levels of the country's economy.

A Strategy for Operation

After modern maintenance and repair services have been introduced to the enterprises and engineering establishments through the activities mentioned earlier, they have to be organized and put into operation in at least a few model plants on a selective basis to start with. To choose suitable plants, the following points should be kept in mind: a) The plant should have progressive managers known for their techno-managerial excellence. b) The plant should have a high level of production, and there should be scope for demonstrating the effectiveness of maintenance and repair systems in terms of financial gains that could impress and inspire others. c) The plant should be in a major line of production in the country so that its example and experience could be readily followed by other firms in similar lines of production. The principle of selectivity can also be applied in choosing crucial areas of plant operation on which to concentrate improved maintenance and repair services. The higher the cost of breakdowns, the greater the attention required.

To determine which areas are critical, the operations and equipment of an entire plant may be divided into four categories on the basis of what may be popularly called a VEIN analysis. V = Vital areas where any breakdown would result in very costly repair or replacement and almost a complete closure of the plant for a considerable period, and for which no standby facilities are available. (Examples: a cupola in a foundry, or a turbine in a thermal plant when local repair facilities are not available.) E = Essential areas where any breakdown would result in expensive repairs and replacements and cessation of work for a substantial period in a major area of the plant for which no standby facilities are available. (Examples: failure of the main power unit in a conveyor system, or failure of a major heat-treatment furnace used for softening forged materials before machining in the direct line of production.) I = Important areas in the operation of an enterprise. Although standby or local repair facilities may be available, a breakdown in these areas would still involve substantial expenditure and a serious interruption in production. N = Normal areas of maintenance operation in which a breakdown will entail nominal expenditure for repair or replacement or minor delays in plant operation.

The VEIN analysis takes into account the direct costs involved in repair or replacement, as well as the indirect costs arising from interruptions in plant operation. A broad analytical estimate is all

that is needed initially. The operation of maintenance and repair services must ultimately be based on economic rather than purely engineering considerations. It may be possible for the engineers to eliminate breakdowns even of ordinary items, but it may often not be economic to do so, as it is futile to spend pounds to save pennies. It should be stressed that the method of determining the economic feasibility of maintenance and repair work must be the developing country's own. It cannot be copied, even from similar factories in the Western countries, where labor costs are high and replacement costs often less high.

Organization of maintenance work. It may not be practicable to meet the need for preventive maintenance for the whole establishment all at once. The VEIN analysis applies the principle of selectivity in terms of economic considerations, not of the physical or functional divisions of the enterprise. The question here is to determine how maintenance work should be organized, and how much of this work can be carried out by the shop managers or supervisors of different work centers. The first step is to make a careful inventory of machinery, buildings, auxiliary equipment, safety and fire protection devices, and list each item under one of the VEIN categories. During the early stages, when maintenance staff are still being mobilized and trained for the job, it will be desirable to entrust "vital" and "essential" items from the lists to the centralized maintenance organization, delegating the responsibility for the maintenance of "important" and "normal" items to the shops. As experience is gained the division of responsibilities can be adjusted.

It is important to establish some systematic routines for "preventive" maintenance, including inspections, lubrication, adjustments, and also preventive repairs of equipment where timely attention to a part could eliminate a more serious malfunction later if it were neglected. However, there are economic limits to the time and personnel that are worth devoting to such work. The problem of how to reduce losses by adjusting the frequency and depth of inspection of equipment is a technical question requiring systematic engineering analysis on the following lines:

a. Age, condition and value. Older and poorer equipment needs more frequent service. But if the equipment is ready for the junkpile or soon to be obsolete, it may be cheaper to inspect on a skeleton basis or not at all.

b. Severity of use. More severe applications of identical equipment require more frequent inspections. In a process plant a critical pump may need to be inspected every day; the same type of pump in a metalworking plant may need to be inspected only once a month.

c. Safety requirements. A wide margin must be allowed for safety. For example, one plant inspects the solenoids operating the clutches on presses every two weeks.

d. Hours of operation. Many manufacturers suggest frequency cycles based on an eight-hour day, others on usage (such as mileage).

e. Susceptibility to wear. How great is the exposure to dirt, friction, fatigue, stress, corrosion? What is the life expectancy?

f. Susceptibility to damage. Is the equipment subject to vibration, overloading, abuse?

g. Susceptibility to maladjustment. How will maladjustment or misalignment affect it? Where manufacturing tolerances are tight, a shorter inspection cycle is needed.

In the developing countries, experience has shown that many items that the Western manufacturer would suggest replacing after a defect has appeared can be repaired satisfactorily. A critical technical examination of the possibilities for satisfactory repair may result in considerable savings for an enterprise, since manufacturers are often eager to sell extra spare parts and may recommend replacement far too early.

Apart from breakdown repairs, it is convenient for administrative purposes to include preventive and upkeep repairs under repair services performed by the maintenance department (as opposed to the department where the machine is used), irrespective of whether the work involved is derusting of pipes, painting of buildings, welding, or electro-deposition of metals on worn-out parts. One reason why simple repair work in the developed countries is often not undertaken by the maintenance staff, even when this is well within their technical competence, is that the latter have to work on highly organized and tight schedules for inspections and other work imposed by the requirements of preventive maintenance. It would not be possible for them to adhere to the predetermined maintenance schedule if they were to undertake even simple, routine repair work. This is not the case, however, in most developing countries, particularly in the initial stages when maintenance programs have considerable flexibility. What is most important is to keep alive a spirit of service, particularly among the supervisors of the maintenance teams.

Basic additions to and alterations of the existing plant facilities should usually be specially scheduled in advance of need. But when the nature of the work involved is such that these improvements could

be made without much dislocation of normal work, it would be economic for the maintenance and repair departments to undertake them. Before accepting any such additional responsibility, the top management should understand the precise technical and economic implications of these improvements.

Routine and simple repair work should be undertaken by the maintenance staff, for which a maintenance workshop should be provided. The advantage of having such a workshop under the maintenance department would be that work could be undertaken immediately, depending upon urgency of the situation, without seeking extra-departmental assistance. Naturally, a workshop of this nature will not be able to carry out major repairs. For this purpose, assistance from the regular engineering departments may have to be obtained, and when such repairs are beyond the technical competence of such departments, outside assistance may be necessary. This means that the supervisors in the maintenance shops should be familiar with the technical capabilities of the enterprise and of outside workshops that may be located in the vicinity.

Irrespective of whether major repair and overhauls are undertaken by the enterprise or by an outside shop, an effective order of priorities for their execution has to be established under the authority of the top management. It will be appreciated that operation of satisfactory systems of maintenance and repair are matured and built up over several years, even in the developed countries. The published literature and guidelines on these are vast and complex; the above paragraphs attempt only to highlight some of the major areas of importance.

Cost calculation is an essential part of operating and evaluating maintenance and repair services. Without a reasonably satisfactory method of calculating costs the effectiveness of maintenance and repair services may be seriously handicapped. Calculation of costs that are based on so many variables, some of which are little more than broad approximations if not speculations, can hardly expect to attain the degree of perfection that is normally expected by the accounting profession. Yet this limitation has to be accepted, and attempts must be made to make the best of a difficult situation.

The direct costs of maintenance and repair are comparatively easy to compile, since they are based on costs that have occurred in the past. But the indirect costs of shutdowns or interruptions are likely to vary widely unless they are adequately supervised by experts. The VEIN analysis may be used as a basis for calculating these costs. In doing so the best answer usually is to translate the loss of production in terms of manufacturing costs and add on the proportional overhead costs. In most factories in the developing

countries, records of time spent for routine breakdown repairs may not be available. But as these repairs are carried out throughout the factory fairly frequently, they could be computed statistically through work sampling. As regards major breakdowns or interruptions in production, records may well be available, and in these cases the cost of breakdowns should be computed in terms of money values. If records are not available, it should be possible to obtain the information necessary for computing the costs from workers and supervisors, since they should know the frequency and extent of such important events as major breakdowns. This would mean reliance on verbal statements, but this is the best that can be done without more precise information. The economic gains generated through strengthening maintenance and repair services can be computed in terms of reduction in interruptions in production, reduction in repair and replacements, including addition of proportional overhead costs to the figures.

[Excerpted from "A Strategy for Introducing Systems of Maintenance and Repair in Developing Countries," Industrialization and Productivity. New York: United Nations (for UNIDO, Vienna), 1971, Bulletin No. 18, pp. 38-45. UN Sales No. E.71.II.B.19.]

Central Repair Workshops in Developing Countries

A. Laberenz and G. Sain

[The establishment of central workshops where repair work can be undertaken for nearby factories and firms which are too small or limited in resources to justify elaborate maintenance staff and equipment of their own, and where spare parts can be stocked or made, is a useful investment for developing countries. These workshops are more needed in such countries than in older industrial nations.]

Compared with industrial enterprises in developed countries, enterprises in developing countries encounter special difficulties in maintaining, servicing and repairing their mechanical equipment and vehicles. Enterprises in industrialized countries have the advantage of being located relatively near the manufacturers of their equipment. Thanks to the dense road and rail network and highly efficient postal and telephone systems, it is possible to order and receive spare parts within a very short period. Orders placed by telephone or teleprinter reach the producer within minutes, and a well-organized enterprise can dispatch the order on the day it is received. When ordering spare parts, the machine operator can consult an illustrated catalogue in which the spare parts are listed; he can quickly find the order number of the damaged part and place his order. The entrepreneur in an industrialized country can also take advantage of the well-organized repair services that equipment suppliers generally provide to their customers. Their trained personnel, operating special customer-service vehicles

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equipped with tools and spare parts, render prompt assistance when called upon. In addition, there are specialized workshops that can carry out heavy and specialized repair work.

In developing countries, distances between the manufacturer and the purchaser of the machines are usually very great. There are few machine producers in the country, or none at all, so that most of the machines and equipment must be supplied from producers abroad. Transmission of orders to the producer depends on the means of communication available, and communication with the foreign producer can frequently be very time-consuming. Inquiries—which are quickly dealt with in industrialized countries—may take weeks in developing countries. Furthermore, operating instructions, data on mechanical equipment and spare part catalogues are not always available or printed in the language of the country concerned. Obviously, translations may easily lead to misunderstandings. Regular customer services are still lacking in most developing countries. The delivery of spare parts can also be delayed through the obstacles to obtaining the necessary import permits and custom clearance, etc., as well as through the inefficient transport system within the country. Special problems have arisen in developing countries because they have obtained from industrialized countries a variety of machine makes, all of which differ considerably from one another in their servicing and maintenance requirements as well as their spare parts. It even happens that a machine has gone out of production and the spare parts required are no longer available.

The solution to these problems would be to make the consumer as independent of the manufacturer as possible with respect to spare parts and repairs. The basic problem here is how to manufacture and repair the machine parts needed by small businesses. Owing to the lack of skilled workers and the necessary equipment, industrial enterprises in developing countries are generally unable to maintain their own mechanical engineering shops. Small enterprises are unable to provide full-time employment for skilled repair workers.

Central Repair Shops

Some of these difficulties may be overcome by establishing central workshops which, once equipped with skilled personnel and adequate machinery, are able to repair machinery that has broken down and even produce the required emergency spare parts. Central repair shops are specialized repair shops servicing various industries and other establishments in a specific region. The repair shops can be of great use in regions where there is a relative concentration of industries, in particular small-scale industries, that have similar repair requirements.

The location of a central repair shop obviously depends on the location and density of the industries it services and on what means of transport and communications are available. The customer should be able to contact the repair shop quickly. The proximity of an airport is another factor that may influence the choice of location. Another important factor in determining the location of the central repair shop is the availability of a main electricity supply. Generating equipment belonging to the repair shop could, however, replace the public electricity supply. The supply of water is also a factor to be considered. When selecting the location of the central repair shop, attention must finally be paid to the transport facilities to the closest housing area.

The tasks of a central repair shop have three aspects:

a. Repair of machinery and equipment and the production of certain spare parts. Central shops can carry out repair work beyond the technical scope or economic means of an individual enterprise. In particular, this concerns repair work requiring heavy repair equipment and/or highly skilled labor. The central workshop can economically use this heavy equipment and employ such labor.

b. Training of apprentices, skilled workers, masters, and unskilled workers through organized courses and demonstration of machinery.

A well-equipped central repair shop can easily prepare 20 to 30 apprentices per year for skilled worker's examinations. That means that with an apprenticeship of three-and-one-half to four years the shop will always have 80 to 120 apprentices in training. A well-equipped workshop is necessary for the first two years' training of mechanics, precision mechanics and toolmakers, blacksmiths, motor mechanics, electricians and perhaps also joiners. The number of apprentices is determined by the size of the shop, its mechanical equipment and, not least, the number of skilled workers able to pass on their knowledge and skill to another person. The future technological development of a country depends on the quality of training given to apprentices; those who set the standards must appreciate this fact.

Advanced training courses for skilled workers leading to a master's certificate should be held along with apprentice training courses. In addition short training courses for unskilled workers should be held in conjunction with apprentice training courses, in order to create a labor force capable of carrying out work that does not require a craftman's skill. This will considerably reduce the cost of repair work. The further training of workers for specialized work

must also be considered. The training of workers in special skills such as autogenous and electric welding, shielded arc welding, is in the interest of the central repair shops, because it will enable small enterprises eventually to do their own repair work which will then reduce the central repair shop's work load.

c. Contracting. For the most part, repair work will be performed on contracts covering the full costs of services [how the training costs should be covered is a policy question not discussed here, nor is the question of subsidized repair work.]

The planning of a central repair shop must be based on the expected volume of repair work. If the inflow of work is not continuously in correct proportion to the size of the shop, additional work of a different type may be undertaken. For instance, the manufacture of certain consumer goods could be commercially feasible, using the presses available, and this would fill the gaps between repair work. Care must be taken, however, not to allow repair work on vital machinery and equipment to suffer as a result of the production of consumer goods. Repair work and the production of replacement parts must always be given priority.

Requirements

The central repair shop should be equipped with a sufficient number of machine tools of different sizes and working capacities and of the most straightforward design and construction, possessing all the usual fittings, together with special attachments, and a complete set of tools. Special-purpose machines that remain unused most of the time, and therefore represent a bad investment, and also automatic and semi-automatic machines, should be avoided and preference given to manually operated machinery, since work sent to the central repair shops is so varied in character.

The central repair shop will need the following equipment:

a. Machine tools—lathes of various types; bench and column-type drilling machines; milling and planing machines of various sizes; grinding machines of various types, e.g., tool grinding, cylindrical grinding, surface grinding, double wheel stand grinders; sawing machines;

b. Welding shop—electric and autogenous welding and cutting equipment, spot welding equipment;

c. Smithy—blacksmith's forge, anvil and swage blocks;

d. Tinsmith's shop—tin shears, multipurpose machine, folding press, embossing and bending machine, flanging and wiring machine, hydraulic presses;

e. Joinery—planing machines, band saw, circular saw, carpenter's benches;

f. Toolroom—a variety of hand-operated electric machine tools and complete tool sets;

g. Apprentice workshop—workbenches and vices;

h. Classroom—appropriate equipment.

Should the planned central repair shop include vehicle repairs, the following equipment will be needed:

a. Engine repair shop—equipment required for repair of valves, cylinders and pistons;

b. Shop for the repair of electric units—test stand for dynamo and starter;

c. Battery-charging station—battery-charging equipment;

d. Chassis repair shop—pits, lifting stages, lubricating bays, brake testers, tire repair equipment, balancing machines;

e. Paint-spraying plant.

This list of equipment does not claim to be complete. It is intended to show what equipment a good repair shop should have if it is to carry out a wide range of repair work and cannot exactly anticipate the tasks with which it will be confronted. When the repair shop is being planned, it must be ensured that sufficient materials and tools that are subject to wear are available. Special emphasis must be placed on the supply of technical gases. Owing to the large number of machines and equipment obtained from various countries, tools of both the metric and the British systems must often be available. This applies above all to drills, screw taps, reamers and spanners.

Some problems. There is no doubt that in most developing countries there is a real demand for central repair workshops. Much has been done in the field of training, especially the training of apprentices, but there is no agency where repairs, training and perhaps the production of consumer goods are carried out under the same roof; the establishment of such an agency would be desirable. Nevertheless, the establishment of a central repair workshop raises

certain problems. In many regions where businessmen are already operating relatively simple machinery, it is possible to find workers who are prepared to carry out repairs on this machinery, but their equipment for doing so is primitive. Under these circumstances, the repairs, which can be made in a central repair shop in a few hours, require many days of laborious work. These workers lose their jobs when a central repair shop is established. On the other hand, there is a danger that in a modern enterprise like a central repair shop the administration may develop out of all proportion to the size and profitability of the enterprise, with the result that the cost of the jobs to be done will be high. The customer will have to consider carefully whether the repairs may not be cheaper when carried out in the traditional way with hammer and chisel, even if he has to wait longer.

Another question to be decided is whether the central repair shop should be a governmental or private enterprise. Who is to provide the funds for the initial equipment? Are funds available from foreign aid or will the government have to provide the money? Who will administer the enterprise? If the enterprise is to be run privately, how can prices be controlled?

Mobile workshops have proved their value all over the world, and should be particularly important for developing countries. Where industrial enterprises are spread over a wide area, or located far from the industrial and transport centers, mobile workshops can significantly assist individual establishments. A mobile workshop is generally mounted on or in a normal vehicle, such as a truck or station wagon, or sometimes a vehicle with special features. The size and the equipment obviously depend on the type and volume of the jobs to be carried out. The vehicle should not only transport the equipment but also provide working space for several craftsmen. The craftsmen, including the driver, should be trained in as many skills as possible. The mobile workshop will diagnose mechanical defects and carry out repairs on the spot. Straightforward repair work and the production of simple spare parts can usually be carried out on the spot with the equipment at hand. In other cases the damaged part or machine must be moved to the central workshop to be repaired or remade. For this purpose a number of transport vehicles belonging to the central repair shops must be available on request.

Central workshops, mobile workshops, transport facilities for the central workshops, as well as the supplies of material and spare parts for these repair shops and the shops within industrial enterprises, must be regarded as necessary elements of a complete system for repair. The establishment of such a system requires thorough planning with due regard to the present and future industrial structure and location and the resources available.

Estimated costs. The following tables give estimated costs in U. S. dollars for three types of workshop under conditions typical of India, which may serve as rough guidelines adaptable to establishments in other countries by price and salary adjustments.

Table 1

REQUIREMENTS OF TYPICAL VILLAGE BLOCK WORKSHOP IN INDIA

Initial cost of land, buildings and equipment	*Estimated cost in US dollars*
Land, buildings, power and water connexions etc.	2,600
Centre lathe	5,000
Drilling machine	1,500
Welding equipment—both gas and electric	1,000
Bench grinder	400
Testing equipment for fuel injection system	7,000
Miscellaneous facilities (fitting bench and vice, tools etc.)	500
Conveyance (motorcycle) for providing the necessary mobility to the mechanics	600
Total cost	18,600
Working capital	
Cost of stocking necessary spares for tractors, pumps, motors, diesel engines, and normal materials required for maintenance	2,000

Personnel

In addition to the owner/manager who should be a person with technical background and should be responsible for organizing and maintaining the facilities, purchasing, billing and collection, trouble shooting and general administration functions, the following staff is needed:

	Yearly salary in US dollars
One general-purpose machinist who can operate lathe, drill, grinder and welding equipment	800
One general-purpose mechanic or fitter specialized in automobile maintenance. (The number of such mechanics can be increased depending upon the work load.)	900
One general-purpose helper	300
Total cost	2,000

Table 2

REQUIREMENTS OF TYPICAL MOBILE WORKSHOP FOR RURAL AREAS IN INDIA

Plant and equipment	*Estimated cost in US dollars*
3- or 5-ton truck with special body	5,000
Centre lathe	5,000
Drilling machine	1,500
Welding equipment both gas and electric	1,000
Bench grinder	400
Shaper	600
Workbench, tools etc.	1,500
Electric generating set diesel (optional)	2,000
Heat-treatment furnace and forge	2,000
Total cost	19,000
Working capital	
For special steels, spares and other material for maintenance, travelling, fuel oils and other charges	2,000

Personnel

It is proposed that the mobile workshops be operated by SISI under the supervision of extension officers specially trained for maintenance. The salary of such personnel is not accounted for. Other personnel required are:

	Yearly salary in US dollars
Truck driver-cum-generating set operator	900
Machinist	900
Turner	900
Welder/heat-treatment operator	900
Fitter, forgeman	900
General-purpose worker	900
Total cost	5,400

Table 3

REQUIREMENTS OF TYPICAL COMMON FACILITY MAINTENANCE SHOP FOR SMALL INDUSTRIES IN URBAN AREAS IN INDIA

Initial cost of land, buildings and equipment	*Estimated cost in US dollars*
Land and buildings	7,000
Two centre lathes—one for precision jobs and the other for general-purpose turning jobs	10,000
Universal milling machine	8,000
Surface grinder	6,000
Shaper	1,200
Drilling machine—which can also work as a vertical boring machine	3,000
Bench grinder	400
Welding equipment—both gas and electric	1,000
A heat-treatment furnace and a small forge	2,000
Miscellaneous equipment for fitting jobs (benches, vices, tools etc.)	1,000
Office equipment and furniture etc.	800
Other miscellaneous initial expenditure	600
Total cost	41,000
Working capital	
For stocking the normal spares, tools and materials for maintenance jobs, electricity, gas etc.	2,000

Personnel

In addition to the owner/manager who should be a person with technical background and who will be responsible for the utilization of facilities, purchasing, billing, collection, recruitment and training of staff and general administration, the following technical personnel is needed:

	Yearly salary in US dollars
Two turners ($900 each)	1,800
One machinist	900
One welder/heat-treatment operator	900
One general purpose fitter/forgeman, with some training in electrical jobs	900
One die fitter	900
Two helpers for general-purpose jobs ($600 each)	1,200
Total cost	6,600

The exact number of persons however should depend upon the work load; it is most important to control closely the utilization of maintenance workers.

[Condensed from "Central Repair Workshops in Developing Countries," Industrialization and Productivity. New York: United Nations (for UNIDO, Vienna), 1971, Bulletin No. 18, pp. 46-49 and 51-52. UN Sales No. E.71.II.B.19. The original article was based on two background papers presented to the Symposium on Maintenance and Repair in Developing Countries, organized by UNIDO with participation from 80 countries, held in Duisburg, Federal Republic of Germany, November 1970.]

The Role of Maintenance and Repair in Industrial Development

Josef Molsberger

[Poor maintenance and repair practices lead to significant reductions in industrial output and to foreign exchange costs for many developing countries. Optimal policies for maintenance require close consideration of alternatives in initial machine durabilities, in capital and labor intensities of maintenance methods, and in numerous other policy areas such as import controls and training programs.]

Losses in Production and Growth Resulting from Poor Maintenance

The lack of proper maintenance practices has serious consequences for economic development. The most eye-catching loss caused by poor maintenance or inadequate repair is the premature deterioration or total destruction of productive capital in many developing countries. Reports by United Nations experts mention numerous instances where equipment was allowed to deteriorate beyond repair and had to be replaced. Negligence in the maintenance of buildings and structures can cause—in addition to direct losses—secondary damage to machinery that is inadequately protected. Since capital is scarce in developing countries, the importance of the destruction of capital is much greater than it would be in an industrialized country. Thus, the marginal impact on growth is likewise greater.

Deterioration or destruction of equipment leads to losses in production. These losses are twofold: a) undetected wear and tear of machinery, or neglect of control devices, usually results in deterioration of

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product quality; b) inadequate maintenance or incompetent repair causes frequent breakdowns of machinery leading to disruptions in the production process. During downtimes, when no productive services are being rendered, wages of idled labor and capital cost for idled equipment still have to be paid. The situation is aggravated if the repair cannot be carried out or the spare parts cannot be delivered immediately. The economic penalty for cessation of operation is highest for continuous-process industries; for fabrication, or assembly of discrete units, the cost of interruptions is lower.

Production losses caused by poor maintenance and repair in one firm have negative effects on firms that are customers of this firm. If the quality of intermediate goods is poor, the quality of the final products will also be poor unless the final manufacturer carries out further processing. If the quality is so poor that a material cannot be used at all but is still passed on to the customer, there is needless haulage by railways or trucks. Frequent breakdowns of machinery, which reduce the output of a firm or lead to irregular deliveries, also affect the industry that is supplied by this firm. To reduce their dependency on unreliable suppliers and keep their production flow more regular, many firms customarily carry large stocks of intermediate products, which tie up scarce capital. The construction industries provide good examples of induced losses: negligence in the maintenance of construction equipment causes delays in the completion of buildings. In important industrial projects, such delays will cause new delays and inconveniences in the interrelated industries and setbacks in the implementation of a country's economic plan.

Other induced losses occur because of bottlenecks in the supply of spare parts, which may arise if their import is restricted or if their shipment is impossible without lengthy delays. Hence, many firms try to hold an abnormally large stock of spare parts. For the individual firm this policy is reasonable, but for the overall national economy it means a waste of resources.

Disguised losses. It is well known that in many developing countries installed capacities are underutilized. It is less well known that excess capacity quite often disguises inadequate maintenance, at least temporarily. The breakdown of a poorly kept machine need not disrupt the firm's production process: a switchover to idle equipment is a frequently used device to keep production going. Only if the practice of poor maintenance and incompetent repair is continued for some time will deterioration and frequent breakdowns of the whole set of equipment become apparent.

The cannibalization of machines also belongs to the category of losses disguised by excess capacity: parts are stripped from idle machines to obtain the spares needed for broken machinery. This is

only a temporary solution to the problem of obtaining spare parts. The basic issue is the failure, whether of government policy or at the enterprise level, to provide for an adequate supply of spare parts. As a consequence, the firms make uneconomic investment decisions.

Deterioration and delays in delivery can be disguised in a seller's market. Producers and always able to dispose of poor-quality products when there is a serious shortage of supply. The situation is not unfamiliar to developing countries where tariffs or quotas bar the import of competing goods. Poor performance is particularly well disguised if the product allocation is no longer left to the market forces of supply and demand, but is replaced by an administrative distribution system that forces consumers to purchase from firms not necessarily of their own choosing. Here, consumers have to accept whatever quality is made available at whatever time.

Foreign exchange losses and damage to goodwill. The developing countries generally have to import most of their industrial capital equipment and most of the spare parts to maintain this equipment. Inadequacy of maintenance makes it necessary to replace parts excessively often, sometimes even to exchange the whole machine before it reaches its normal service life. This implies an unnecessary loss in foreign exchange; it is an absurd situation in countries that suffer notoriously from severe shortages of hard currencies.

Possible losses on the export side should not be overlooked either. Poor-quality products and lengthy times of delivery will not win customers in export markets. Once buyers realize that quality has deteriorated, future exports may be jeopardized. The "MADE IN..." mark of origin may lose its attraction, and the loss of confidence may not be confined to the actual low-quality product—it may well affect other exports of the country. The loss of prestige may become so serious that not even expensive marketing campaigns abroad or participation in international trade fairs will fully restore it.

Measuring the Importance of Maintenance and Repair

The public authorities engaged in national economic planning need to have estimates on present and future maintenance requirements: the total cost, import content, and the manpower needed. Surprisingly, very little statistical information exists on aggregate maintenance and repair activities in the manufacturing industry of developed countries. Only one comprehensive report on the subject has been published by the United States Bureau of the Census as part of the 1958 Census of Manufactures; neither in the half century before nor in the decade after this date have maintenance and repair costs been included

in the Census. [These data indicate the relative importance of expenditures on maintenance and repair in one country where these are systematically performed in many areas; they give no information, of course, on the costs of neglecting maintenance, but presumably these would be much larger than the maintenance costs.]

The results of this survey show that, in 1957, $9 billion was spent in the United States for maintenance and repair on structures, grounds, and equipment of all operating manufacturing establishments. This sum is rather remarkable. In the same year, expenditures of the manufacturing industry for new plant and equipment totalled $12 billion, of which expenditures for new machinery and equipment came to $8 billion—a sum lower than the total spent on maintenance and repair. The outlays for maintenance and repair average 8 percent of the gross book value of the fixed assets (the cost of assets at the time of purchase). The data for the individual industry groups show a very even and narrow distribution around this 8 percent: 16 out of 20 industry groups spent between 6 and 10 percent of the value of their fixed assets for maintenance and repair; for 12 of these 16, the percentages range from 7 to 9.

Total maintenance and repair expenditure is broken down into "salaries and wages paid to own employees" and "other maintenance and repair costs." On the average, within all manufacturing industries of the United States, half the $9 billion spent on maintenance and repair went for salaries and wages paid to the firms' own employees. Again the data for the different industry groups show only small deviations from this average; 15 out of 20 industry groups spent between 45 and 55 percent. The non-wage costs include both supplies used for maintenance and repair and the maintenance and repair services purchased from other companies. Hence, the breakdown does not distinguish the labor element in the purchases from other firms. Taking this into account the overall share of labor in the total maintenance and repair cost appears to be about 60 percent. Within manufacturing firms, maintenance employees' wages average 6 percent of total payrolls and 9 percent of production workers' payrolls.

Influence of the Interest Rate and Factor Prices on Capital Durability and Maintenance Outlays and Longevity Choices

Maintenance and repair costs represent outlays aimed at extending the service life of the equipment that occur after the equipment has been installed and has begun to operate. Spending on maintenance is one way to extend the service life—the "longevity"—of capital goods. The other way is to spend on higher quality at the time of purchase of the capital good so that it is less prone to wear and tear. Longevity

outlays can thus be broken down into durability outlays and maintenance outlays; these are interrelated and should be considered together.

Durability outlays are made for the built-in, enduring quality of a capital good. The price of higher durability can be compared with the cost of maintenance of initially less durable equipment that can only reach the same longevity if it receives better care and if parts are changed more often. It should be pointed out that the variations in durability should be compared for equipment having the same operating characteristics. Where greater durability can be reached by dispensing with accuracy of operation, speed, versatility, complicated control devices of a machine—in short, by simpler construction and hence at a cheaper price—the operating characteristics of the machine will be altered. On the other hand, greater durability for equipment of the same kind is possible only by making it more expensive: by choosing better materials, a costlier construction, by assembling the parts more carefully and inspecting the work more often and more thoroughly. Thus, greater durability has its price.

To get a certain desired longevity of equipment, a firm can spend more on durability and less on maintenance, or vice versa. Generally a mix of both durability and maintenance outlays is needed. Within limits imposed by technical constraints, a substitution of maintenance outlays for durability outlays is possible. For every investment the optimal combination of both kinds of outlays is to be defined. The optimal combination is that which, for any assumed longevity, minimizes the total cost of longevity.

Durability outlays occur at the time of the initial investment, maintenance outlays only in the future. To compare both, the future costs of maintenance have to be discounted to the present, using the given rate of interest. Discounted at a higher interest rate, the present value of future costs will be lower, and vice versa. Assume two countries, one having a low, the other a high interest rate; the equipment invested, the maintenance techniques, and the future price of a "maintenance unit" (labor plus materials) are assumed to be identical. In the high-interest country "maintenance" is cheaper than "durability." Other things being equal, the country with a higher interest rate should spend more on maintenance and less on built-in durability to obtain a given longevity than the country where capital is available at a cheaper rate.

The next question is how much longevity of equipment should be chosen. The costs of additional longevity must be compared with the "savings" that result from postponing the capital replacements in the future. When discounted at a high interest rate, the value of these future savings will be reduced; the value of longevity costs,

however, will not be discounted to the extent that they result from initial durability expenses. Other things being equal, the optimal choice of capital longevity in the country with a high interest rate would thus be a lower capital longevity, compared with the country with a low interest rate. However, if the former country can rely heavily on maintenance (and less on built-in durability) in order to obtain a desired longevity, the optimal policy would be to realize this substitution as far as possible; then longevity will not be reduced very much.

Differences in the interest rate between two countries reflect differences in the factor endowments in these countries. A high interest rate indicates a relative scarcity of capital and a relative abundance of labor, so a country with high interest should also have relatively low wages. Differences in the wage rate influence the (future) value of maintenance costs. Maintenance and repair costs are also composed of "capital" outlays for spare parts, tools, materials, mechanical aids; and some substitution between labor and capital is possible. For the low-wage country, the substitution of cheaper maintenance labor for maintenance capital will result in a further reduction of total (future) maintenance costs. The previous conclusion ought to be modified: the combined effect of a high interest rate and a low wage rate will make it economically optimal for the country to choose a greater capital longevity than the low-interest, high-wage country when the higher longevity can be substantially achieved by substituting maintenance for durability and, in addition, by choosing labor-intensive maintenance techniques. As will be indicated below, this is very often a realistic possibility.

Finally, if the capital goods used in the two countries, and some of the "maintenance capital" (e.g., spare parts) that is used in both, are produced in only one of the countries, namely the low-interest, high-wage country, then the price of these capital goods is likely to be higher in the other country which has to import them. Transport cost and customs duties will raise the prices. This will reinforce the tendency in the high-interest, low-wage country to substitute maintenance labor for maintenance capital, and will also make the (initial) capital expenditure on built-in durability less attractive.

The combined impact of these differences between two countries can be summarized: country A has a relatively low interest rate, a high wage rate and low prices for capital goods; country B has a relatively high interest rate, a low wage rate, and high prices for capital goods. Under these assumptions it is optimal for country A to invest in capital goods with a short lifetime, to obtain the chosen longevity by spending more on built-in durability and less on maintenance, and to carry out the indispensable maintenance and repair work by capital-intensive methods. The optimal policy for country B

would be to choose capital goods with a long service life, to obtain this longevity by spending less on built-in durability and more on maintenance, and rely for the maintenance and repair activities on labor-intensive techniques.

Empirical evidence shows that this theoretical model may fairly well be applied to maintenance and longevity decisions in the United States as compared with industrialized Europe. It is well known that in the United States equipment is designed so that it will be easy to service. Parts and units are exchanged rather than repaired; repairs and replacement of parts are executed with a maximum of mechanical aid. All this is done to avoid the high costs of labor-intensive maintenance and repair. In industrialized Europe in the post-war period, wages were lower than in the United States and interest rates higher. Labor-intensive maintenance and repair were of much greater importance than they were in the United States. There is not much reliable information on the longevity of capital goods, but in the United States many "durable" consumer goods can be bought cheaply and are disposable after a short service life. There are some indications that the longevity of capital goods in general is lower in the United States than in Europe and that it is declining with time in all industrialized countries.

The Effects of the Quantity and Quality of Available Labor

This model may be applied to industrialized countries on the one hand, and to developing countries on the other. Generally, the developing countries have high interest rates and low wage rates and the prices of capital goods are high, compared with those in industrialized countries. However, it has been assumed that the quality of labor available in a country is homogeneous; in reality this is not the case, and the impact of this fact must be considered.

Generally, there is an abundance of manpower in developing countries but skilled labor is usually scarce. Consequently, unskilled labor is cheap while the wages of the skilled workers are high. Since most of the maintenance and repair activites require skilled workers, the cost of labor-intensive maintenance and repair may be extremely high in the developing countries too. A differentiation must be made between short-run and long-run solutions and among developing countries.

Developing countries can be divided into two groups:

a. Type 1—traditionally agrarian countries that are taking the first steps towards industrialization, have only a poor tradition in handicrafts, and are unfamiliar with even the simpler modern technologies;

b. Type 2—countries that have already a certain industrial tradition, can dispose of a cadre of industrially trained workers, and have a considerable number of craftsmen familiar with the basic techniques of working metal and wood.

Countries of type 1. The most obvious solution where skilled maintenance workers are scarce would be to choose projects that require no skilled maintenance and repair because they have enough built-in durability. However, this is possible only for a very restricted category of projects, such as buildings, roads, or bridges. All kinds of machinery with moving parts need a certain amount of maintenance.

In the short run, these countries have to employ foreign specialists for practically all maintenance and repair work for complicated industrial devices. These specialists receive an even higher remuneration than they do in their home countries. All investment goods and maintenance equipment, too, have to be imported from industrialized countries and hence will be more expensive than in the exporting countries. In this situation the factor-price relationship will not induce substitution of maintenance labor for maintenance capital, nor in general, of maintenance outlays for durability outlays. If favorable credit conditions are offered for the initial investment, the burden of durability outlays will be reduced, and the effect of high interest rates will be moderated.

Under these conditions, the optimum short-run policy for a country of type 1 would be to rely less on maintenance and more on durability, and to extend the lifetime of the equipment only to the point that is optimal in developed countries. If there is a choice between two types of equipment, one requiring highly specialized production workers but less skill in maintenance and repair (simple machinery), the other requiring semi-skilled workers in production but highly skilled maintenance workers (sophisticated equipment), the decision should favor the second type of equipment—the optimal choice also in the industrialized country. This is so because maintenance workers have to be "imported" anyway—for both types of equipment. Semi-skilled production workers, on the other hand, can be trained in a relatively short time; foreign assistance is needed here only in the initial stages.

When policy is considered for the long run, the dynamic effects of economic development come into play. In this context the most important effect of economic growth is the development of manpower skills. Optimal policy in the short run has to follow a pattern of investment as if there was no abundance of labor; but optimal policy in the long run has to develop a highly skilled labor force, because this is the only way in which a country in the early stages of develop-

ment can eventually reach the point of substituting abundant—skilled—labor for scarce capital and profit from its comparative advantage in cheaper manpower.

The types of training developed depend on the types of industry chosen. Whether it is easier to train people for production than for maintenance is debatable; experts have expressed opinions on both sides. For example, one opinion is expressed by an American steel engineer:

> Lack of experienced and technically skilled workers can best be offset by using methods and processes in which the operations requiring skill are entrusted to machinery to the greatest possible extent. Skill in maintenance, mechanical and electrical work seems to be more easily found or developed than that required for complicated manual operations such, for example, as in sheet or tinplate rolling.

The applicability of such a judgment would seem to vary by industry. Further, the different cultural backgrounds of developing countries may induce different attitudes of labor towards a certain job. The general underevaluation of maintenance activities is likely to affect the "professional" status of the repair-and-maintenance man negatively; hence, it may be difficult to recruit candidates for maintenance training.

The generally accepted expert opinion seems to be that, whatever may be true about relative skill requirements, efficient maintenance habits are the most difficult to promote. Some experts therefore give preference to industries having the highest "educational" effect. Hirschman, for example, recommends that developing countries concentrate on new ventures with a complicated technology (preferably machine-paced, process-centered) that compels maintenance. According to Hirschman, "simple" (labor-intensive) industries present too many "latitudes," too much tolerance of poor performance in maintenance. These propositions raise the question of the availability of capital; the cost argument is indeed fundamental. Limited access to foreign capital has in practice induced most developing countries to pursue more modest industrial projects. This may provide more numerous opportunities for workers to acquire trained skills, though at a somewhat lower level, and to be trained to adopt maintenance habits. The training of repairmen for "breakdown maintenance" of simpler industrial equipment has the advantage that it familiarizes workers with simple techniques and avoids the discouraging "latitudes" and the high organizational requirements of preventive maintenance. This form of training appears to be particularly suitable for developing countries with very few skilled maintenance workers. The training of experienced repairmen for preventive maintenance would be the next step.

Countries of type 2 are better supplied with labor than the predominantly agrarian countries of type 1. They can already count on a cadre of workers familiar with maintaining and repairing simple, conventional equipment. In the short run, these countries may have to rely on foreign specialists for the servicing of some complicated modern industrial equipment, but these specialists can act mainly as advisers, training people rather than doing the whole job themselves.

The problem of training in manual skills may be solved satisfactorily and reasonably quickly, but the problem of developing a maintenance habit remains a pivotal point of long-term development efforts. In most developing countries, not only the labor force but also management shows lack of interest in maintenance activities—if not outright hostility to them. A change in the mentality of management is as important as the acquisition of maintenance and repair skills by the worker. The training of managers and the instruction of foremen may be added to the catalogue of preconditions for raising the productivity of labor to a level comparable to that of industrialized countries.

Once a maintenance habit has been formed, the developing countries in the long run should gain an advantage in maintenance and repair costs compared with the industrialized countries. Although the training and upgrading of maintenance workers as well as a greater awareness of the maintenance problem will eventually cause wages to rise, maintenance labor is likely to remain cheaper than in industrialized countries. Capital will continue to be scarce; therefore, the interest rate will tend to be higher than in the older industrialized countries. With regard to the theoretical two-country model, it may be concluded that developing countries of type 2 are adequately presented in the model of the low-wage, high-interest country, especially in the long run; whereas, paradoxically, the model of the high-wage, low-interest country (normally the industrialized country) is applicable for the short-run conditions of countries of type 1.

Practicable Choices of Capital and Techniques in Developing Countries

Except for a country of type 1 under short-run conditions, the factor relationships in developing countries suggest as optimal policy a "two-stage" substitution of labor for capital: 1) spending less on durability than in industrialized economies, but extending the lifetime of equipment by more intensive maintenance and repair; and 2) relying on more labor-intensive methods of maintenance and repair than is customary in developed countries. The applicability of this policy under present-day conditions may now be examined.

Durability of equipment. Enterprises in a developing country buy most of their investment goods from producers in industrialized

countries. This equipment is generally designed to meet the needs of firms in industrialized countries. In some fields the developing countries have no choice between more or less durable capital goods; they have to accept equipment that is suitable in industrially advanced countries. The only means to approach the desired optimum is to extend the longevity of equipment over a longer period than is customary in industrialized economies by repairing installed plant and equipment when they would have been replaced in developed countries.

In many cases, however, the choice of capital equipment is not so restricted and decisions can be made within a reasonable range of possibilities. There are three ways in which developing countries could obtain less built-in durability of equipment and hence a lower present cost of investment:

a. Some of the equipment supplied by developed countries has different degrees of built-in durability and repairability, that is, requires more maintenance or less maintenance. Firms in industrialized countries make use of this choice, and so could the industrially less developed countries. Sometimes changes in maintenance requirements entail changes in operating characteristics (machines may be run at different speeds, etc.). As long as these changes do not impair the quality of the final product, they are unobjectionable. They may sometimes suit the needs of developing economies even better (smaller-scale production, lower speeds of output, etc.).

b. In the more advanced developing countries (of type 2) where machinery is already produced locally, foreign prototype machines may be redesigned to suit local materials, standards, or skills of operators. Maintenance and repair requirements may also be redesigned. Initial costs for durability can be reduced (but with higher maintenance and repair costs) by using cheaper materials, a simpler construction, or by permitting less accuracy in assembling.

c. A third way to purchase less durability is to import second-hand equipment from industrialized countries. High-wage, low-interest countries replace their equipment when the cost of maintenance and repair rises with the growing age of the equipment. At this point, it can still be economically used in developing countries of type 2, which have cheaper skilled labor available for maintenance. Provided that the cost of transportation and mounting is not excessive and that spare parts will be available, it pays for a low-wage, high-interest country to use second-hand machinery.

Second-hand equipment may be all the more advantageous if the equipment was replaced in the industrialized country only because more modern equipment needing less maintenance had become available. In other words, labor-displacing inventions can make replacement of this machinery profitable in the high-wage countries without doing so in the low-wage countries; the latter may find it a bargain to buy these machines. [See Development Digest of January 1969, pp. 59-65, for a survey of second-hand machinery questions.]

The capital-intensity of maintenance and repair. Compelled by rising wage rates, firms in industrialized countries try to substitute capital for labor in production and maintenance as far as possible. But the possibilities of labor-saving operations in maintenance are more limited than in the manufacturing processes, where capital intensity can be pursued up to the point of automation. Most maintenance and repair work can never be done on a large scale; it is more in the nature of "made-to-order" work and, therefore, quite labor-intensive.

Capital/labor substitution in maintenance and repair can be achieved in three ways:

a. Auxiliary work may be mechanized by introducing mechanical aids for mounting and demounting machines, handling of machine parts, and in transport.

b. The labor content of repairs may be lowered by adopting a policy of "unrepairability and expendability" of components; the single broken part is not identified, removed, repaired and replaced, but a whole "functional unit" is replaced by a new one. By this method the time and manpower involved in fault identification is reduced, and handicraft repair (regrinding, reconditioning, soldering, etc.) is made unnecessary.

c. Economies of scale can be realized by specialized shops for overhauls of mass-produced goods (e.g., truck engines).

These rather limited technological possibilities of reducing the labor content in maintenance and repair work demonstrate that the odds are in favor of developing countries of type 2 where skilled wages are comparatively low. These countries may realize their comparative advantage by:

a. Avoiding all capital-intensive forms of maintenance and repair;

b. Relying on more conventional practices for auxiliary work as well as repair work proper;

c. Aiming at additional capital-saving methods of maintaining and restoring the proper functioning of the equipment. (This includes the identification and exact localization of the broken component so that the number of machine parts that have to be exchanged is minimal. Also, the reconditioning of parts would be preferable to replacing them by new ones.)

It may pay for a low-wage country to produce at least some of the spare parts itself instead of importing them. If local production of spares is labor-intensive this would often make the price of the spare parts attractive. Production of spare parts in industrialized countries may, however, have reached a point of large-scale output where their price is lower than any price at which a low-wage country could hope to produce them without economic loss.

The balance-of-payments aspect. Shortages of foreign exchange have become common to all but a fortunate few of the developing countries, regardless of the degree of industrialization they may have reached. Import substitution and export promotion have been popular recommendations for improving the situation, whereas the maintenance and repair aspect has enjoyed much less attention. Its influence on the balance of payments, however, is anything but negligible.

It is evident that the premature destruction of equipment owing to poor—or lack of any—maintenance causes the need for replacement, and hence imports, to arise prematurely and places an unnecessary burden on the balance of payments. But there is more to maintenance policy than this might suggest. If the choice of machinery purchased by developing countries follows the pattern of industrialized countries, the burden on the balance of payments will be heaviest. It means choosing a high import value when the initial investment is made, high expenditure on spare parts and other "maintenance capital," and finally, high replacement outlays after a short time. An investment policy aimed at reducing production costs and saving foreign exchange, and based on the developing country's factor endowments, would be determined by considerations described above—less initial durability, longevity obtained by labor-intensive maintenance methods—and by developing import substitution for spare parts. At first sight, the largest savings in foreign exchange would seem to follow from the domestic production of the equipment itself. However, raw materials and components must often be imported all the same, which reduces the overall savings. Of course, the development of a domestic machinery industry may still be economically advantageous for other reasons.

Ways of Improving the Maintenance Performance in Developing Countries

The conclusions and recommendations above have been made in the context of the theoretical analysis. Some reflections on practical implications for policymaking are outlined below.

Investment plans should always include estimates on the future needs for maintenance and repair and the possibilities for meeting these requirements. The import needs deserve special attention in countries that are short of hard currencies. In public-sector enterprises, plan targets should not be set in a way that allows or even provokes negligence in the maintenance of equipment. If the plan targets are fixed in terms of quantity of output (instead of the value of salable products or profitability of enterprises), and if this is the only criterion used to judge the performance of firms, sacrifice of other important objectives that may conflict with production is encouraged. Preoccupation with maximizing output in the short run has resulted in some cases in total neglect of product quality as well as maintenance and in-plant training. Typical examples may be found not only in developing countries but also in centrally planned economies such as the USSR. Not only was the management interested in achieving high levels of output even at the cost of destroying capital, but the workers, too, were similarly motivated since bonuses were related only to physical output. Plan targets as well as wage policy should avoid such encouragement to neglect maintenance.

Where studies of the actual situation in an industry or region disclose lack of proper maintenance and repair, the public authorities could improve the performance by establishing regional repair shops, or by encouraging private enterprise to set up such shops. Plans for the creation of industrial estates should always include the establishment of a common repair shop. Special steps should be taken to secure the supply of spare parts. The setting up of regional stocks of spares will often contribute to the solution of the problem. Stocks of spare parts should preferably be linked with a regional repair shop. Possibilities for domestic production of spare parts should be explored thoroughly. The production of spares may be the appropriate first step towards domestic machinery production.

As long as equipment and spare parts have to be imported by a developing country, import regulations remain a crucial point of maintenance policy. Public authorities tend to underestimate the importance of maintenance and repair, as is shown by their reluctance to issue import licenses or their failure to do away with cumbersome administrative procedures that delay imports. A quick and unimpaired import of spare parts is essential for the full utilization of installed capacity, a problem facing most developing countries.

Refusal to grant foreign exchange for one missing spare part may put a unit out of operation for a long time, a unit whose installation may have cost a multiple of the price of the missing spare in foreign exchange outlays. This is "saving" in the wrong place. The undelayed supply of imported spares, furthermore, prevents their unnecessary and wasteful hoarding and the tying-up of capital. National import quotas should be "balanced:" the import regulations must avoid discrimination against either machinery or spares; in many instances this will also mean removal of restrictive regulations on the import of second-hand equipment.

In many of the developing countries, the great variety of types of installed machinery is confusing and poses maintenance problems of its own, especially in the procurement and stocking of spare parts. As for the domestic production of machines, the adoption of a standardization system at the national—or preferably at an international—level could help to reduce the inconveniences substantially. The supply of spares for older, non-standardized equipment must remain secured, nevertheless, to prevent equipment from being prematurely inactivated. Regarding the equipment that has to be purchased from abroad, the simplest way to get largely standardized products is to purchase only from a single foreign country, or from a limited number of firms. This would ensure a minimum of different types of machinery; but reliance on a single supplier country, or even on one firm, may create undesirable secondary problems and a political or economic dependency which is unacceptable. While these extreme limitations should be avoided, a certain concentration on a group of suppliers whose standards are compatible with each other will bring advantages.

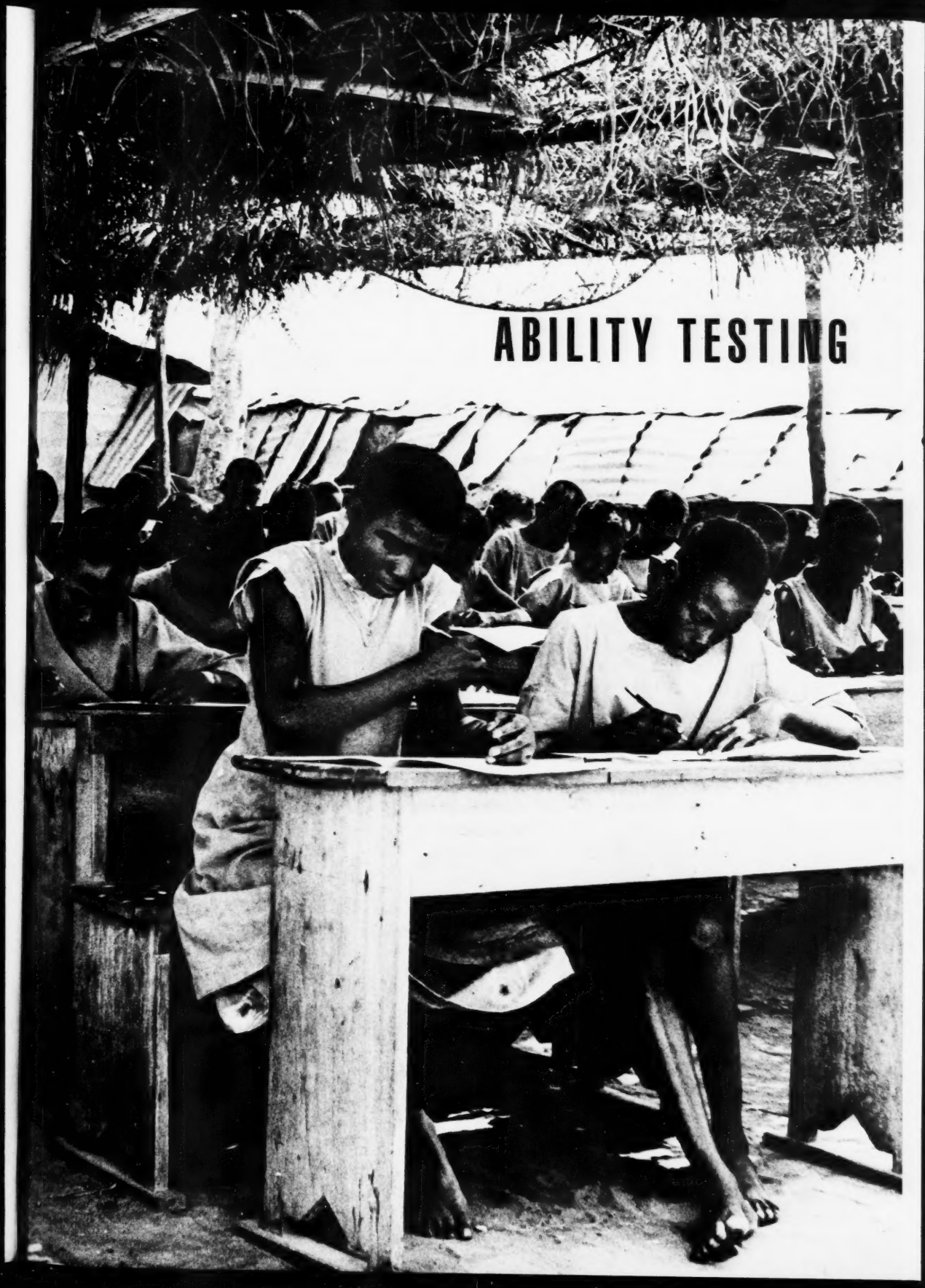
Lack of technical information creates many difficulties in maintenance. The indigenous staff quite frequently lacks proper information on the maintenance and repair of complicated foreign machinery. Directions for the handling of these machines may be incomplete or may pose language problems. Fragmentary information on buying and selling possibilities often makes it difficult for firms to obtain spare parts, and sometimes induces firms not to choose optimal production techniques. Governments can set up an organization for the purpose of collecting and forwarding technical information. The organization might be a technical supervisory agency, as outlined below. Governments should request the assistance of international organizations to furnish more detailed information on maintenance requirements and to rationalize actual performance.

In many industrialized countries, maintenance of machinery and vehicles is enforced by periodic check-ups required by law. These check-ups are aimed primarily at promoting occupational safety, but may also be considered a means of enforcing maintenance standards.

Special supervisory agencies are sometimes entrusted with these check-ups, e.g., the Technischer Überwachungsverein (TÜV) in the Federal Republic of Germany. Developing countries might follow these examples and set up similar agencies. Checking safety devices and the safe operation of equipment should be the main functions of a supervisory agency. This would already cover a wide field of activity and would include control of most of the important maintenance operations. Additional technical counselling on appropriate maintenance could be provided on these occasions, especially for small firms. Another task could be to draw up maintenance manuals and standards, e.g., to give guidelines for the use of anti-corrosion material under special climatic conditions.

In the industrialized countries, a cadre of maintenance workers has developed step by step with—and induced by—the gradual development of capital goods production. Developing countries, on the other hand, skip most of these stages and import modern equipment when their own capital goods production is still in its infancy. Therefore, governments should take deliberate action to ensure the training of maintenance personnel. Such training has a double aspect: one is the creation of technical skills, the other the creation of a maintenance habit. Educational programs should include executives as well as foremen and supervisors. Methods of accelerated training that have proved successful in industrialized countries, e.g., in the Netherlands, can be recommended for developing countries, too. Avalanche effects are obtained by first training a group of instructors in accelerated training courses who can then be assigned to regional repair shops or technical supervisory agencies to organize (accelerated) training in maintenance and repair for the firms in the region. To prevent government-sponsored training centers from becoming overcrowded, setting up of maintenance training shops in big firms could be encouraged, e.g., by offering tax exemptions.

[Excerpted from "The Role of Maintenance and Repair in the Development of Manufacturing Industries," Industrialization and Productivity. New York: United Nations (for UNIDO, Vienna), 1970, Bulletin No. 17, pp. 55-66, 74-75 and 82-85. UN Sales No. E.71.II.B.8.]


ABILITY TESTING

NORTHERN NIGERIANS TAKING AN ABILITY TEST.
[PHOTO: AMERICAN INSTITUTES OF RESEARCH]

Ability Testing in Developing Countries

Paul A. Schwarz and Robert E. Krug

[Selection of the most able people available among applicants for jobs or for further education is especially important in countries where job and school openings are limited, and where national development depends on efforts of a relatively small number of people. Tests of individual abilities and skills, developed and widely used in the U.S. and Europe, are being used in developing countries; problems encountered and methods applied in this transfer are described.]

This report is based on an eight-year program of research and development supported by the U.S. Agency for International Development and carried out by the American Institutes for Research (AID/AIR). The objectives were, first, to devise techniques of aptitude testing that could be applied in cultures in which standard ability tests are not fully effective; and then, to assist in the application of these techniques to human resource development programs in the developing countries. Phase I was a feasibility study to determine whether the probability of devising effective testing methods in these countries was sufficiently high to warrant the fairly substantial developmental investment that might be required. It was begun in July, 1960, in Nigeria. The results included a set of principles for constructing aptitude tests in the Nigerian culture, a series of 12 prototype tests that had been developed in accordance with these principles for purposes of experimental evaluation, and evaluative data that showed these tests to be reasonably effective. Phase II consisted of the further developmental research that was necessary to translate

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these prototype tests into operational forms, and to devise measures of other important aptitudes that had not been included in the feasibility study. By the end of Phase II, a number of operational testing services were actually being provided to education and training establishments and to private employers throughout Nigeria. Additional validity studies were carried out in Ghana, Liberia, Tunisia, and Mali as a first step toward extending the program to other African countries.

Phase III was the first stage of the institution-building effort that, through a variety of successor projects, is still being carried forward today. It began with the objective of establishing a Nigerian center for aptitude testing that could take full responsibility for the continuing development of the program, under the supervision of a Nigerian professional staff and with entirely local financing. In July, 1964, the Nigerian Aptitude Testing Unit began operations, and later provided services to Ghana, Gambia, and Sierra Leone; concurrently, a Liberian Testing Center was developed. Phase IV was the major "generalization phase" of the research, designed to extend the program beyond Africa to other parts of the developing world. It was planned basically as a replication of the Nigerian studies, and was carried out in Brazil, Korea, and Thailand. The objectives were, first, to develop a testing program in each of these countries that would have immediate local benefits and perhaps later serve also as a regional resource for similar efforts in other locations; and, second, to obtain the broad base of crosscultural data that would be needed to expand the testing approaches to more or less universally applicable procedures. When the initial studies revealed that the techniques developed in Africa were equally effective in these new model countries, the effort was shifted to practical applications and institution-building; further methodological innovation was not attempted.

The reason for this ready generalizability of the testing approaches, no doubt, lay in the substantially more difficult adaptation problems that had already been encountered in the African setting. In Africa, the tests had to be given in the second language of the examinees, and much more of the research had to be carried out in remote rural locations. That techniques effective for second-language examinees in rural Africa would be adequate for most applications elsewhere is, in retrospect, not really surprising. At the same time this suggests that certain of the African adaptations incorporated in these techniques may not be necessary for adequate testing in a less challenging setting—e.g., in some parts of Asia. Some of the more economical features of the standard testing approaches in the U.S. can perhaps be reintroduced for greater efficiency in such locations. However, the highly practical orientation of the research does not permit us to say that our techniques are the only effective approach

to test adaptation, or even the one that is best. When we found that a certain procedure provided results of sufficient accuracy for operational use, we generally stopped that aspect of the research and did not look for something better.

The Importance of Cultural Factors in Testing

Much of the discussion below is addressed to questions of how tests of ability can be adapted for use in a developing country. Yet, the how issue is only one of the questions that arises when a new test development project is being considered. Even more fundamental is whether the testing that is to be done actually calls for specially adapted procedures; and if (in theory) it does, whether the practical gains will in fact justify the necessary investment. The first decision that has to be made is whether a proposed test development project is worth doing at all.

Many of the educators and personnel officers who operate testing programs in the developing countries hold widely divergent views on the merits of test adaptation. At the one extreme there are those who look at the vast environmental differences between the developing countries and the highly industrialized nations, and conclude that any test designed for the one ipso facto cannot serve the other. They would exclude practically all of the classic testing procedures from use in a developing country, since they were clearly designed in and for the Western cultures. At the other extreme are those who attach greater importance to the fact that most of the skills needed in both developed and developing countries are exactly the same, and who fear that "simplified" tests that have been changed to reflect different environments will hamper them in identifying persons of equally high levels of skill in their own populations. This group would oppose the use of anything except tests that had been proved successful—in Western countries—since this would be a tacit acceptance of lower performance standards. Of course, neither view is correct; but it may be useful to illustrate them with specific examples to clarify the major issues involved. Both of the following cases occurred during the course of the project.

At a meeting of the national committee for English language examinations in an African country, one of the members strongly objected to the continued use of a single test based on United Kingdom specifications. This test, he claimed, was grossly unfair because students from different parts of the country who spoke different native languages had quite different language learning problems; and the existing test did not take these differences into account. The need was for a series of different English tests, each designed to be fair to a certain indigenous language structure, so that each student could sit for the one test of this series that took account of the pecu-

liarities of his own native tongue. Most of the other members objected. The purpose of an English examination, they insisted, is simply to determine whether or not the student has mastered the language to an acceptable degree. His background is irrelevant to this objective, and special tests should not be developed. The appropriate approach, these members felt, was to retain the U.K. standard of what constitutes "acceptable" English, and to continue testing English proficiency in the same way as before. The counter to this was that "acceptable" English has to be defined in terms of the individual student, and that the proposed series of tests would all reflect equivalent levels of "acceptability." The debate lasted until adjournment, with neither side budging from its original position.

The second example is more complex, in that there was not just one but a wide range of possible modifications to be considered. The manager of the local branch of a large American firm was trying to recruit trainees for advanced technical positions critical to his company's operations. He asked one of the American professors teaching at the local university for help; and the professor obliged by recommending 14 students whom he considered exceptionally well-suited for these positions. Each of the students came in for an interview; each was given the firm's standard selection test; each failed the test and was rejected.

In the postmortem discussions, the professor took strong exception to the selection procedure, and pointed out three specific shortcomings in the approach that had been used. The first was that certain parts of the company's test included problems of a type unknown in the local setting and therefore not suitable for local use; these should have been dropped. The second was that in the rest of the problems, not even the most obvious of cultural adaptations had been attempted. The mathematical exercises involving dollars and cents, for example, clearly should have been changed to the local currency that his students used. And the third was that evaluating the applicants' scores on the basis of American norms (which had indeed been the procedure) was completely absurd. Given the huge differences in the backgrounds of American and local examinees, no single standard could possibly serve as a meaningful yardstick for both sets of scores.

The branch manager disagreed. The job to be performed in this country, he said, is identical in all respects to the job that the company's American employees are performing in the United States. Exactly the same kinds of abilities and skills are required in both locations. And, since the company's test had been designed to measure precisely these kinds of skills, it is as appropriate for selection here as it is there. He was prepared to believe that the requisite skills are less highly developed here than in the United States, but this

meant only that a larger number of applicants would have to be tested to find people qualified for the job. Changing the test or adjusting the norms would, he agreed, simplify his present recruiting problems, but would result in the employment of people who subsequently could not make the grade, and was therefore short-sighted.

And so the students were not employed, and the company continued testing. The number of people affected by the company's decision in this example was small. But exactly the same issues arise in many large testing programs, which are similarly debated. The admission of foreign students to American universities is another, perhaps more familiar illustration. Should one argue that the foreign student will be expected to perform at the same level as his American classmates, and therefore use the university's standard admission procedures? Or should one consider the differences in the backgrounds of the foreign applicants, and try to make suitable adaptations? And if one does decide to adapt the test, how much adaptation is needed? Which aspects of the testing process are most affected by intercultural variations?

In considering these issues, it is convenient to divide the testing process into its three major components, and to examine their separate (and quite different) implications. These components are 1) the test rationale, 2) the specific test content, and 3) the testing mechanics.

The Test Rationale

When one develops a test for a specified purpose, he obviously does not pick the test problems at random but tries to select those that he thinks will be particularly effective. He constructs the test exercises so that they will have a certain logical relationship to the real-life skill that the test is to measure; this logical relationship is called the test rationale. If he wants to select trainees for a carpentry course, for example, he begins by analyzing the job of a carpenter to find out which types of skills might make certain individuals more proficient than others. He might conclude that certain skilled muscle movements are especially important; so, he would design a test that duplicates these movements as closely as possible, and he would measure individual differences in this skill as one part of the selection procedure. The relationship between the muscle movements programmed into the test and the muscle movements involved in the job would constitute the underlying test rationale.

If the test turns out to be effective, the test constructor can reasonably conclude that the rationale was indeed sound—that the logical relationship he posited really is valid. He assumes, even though he may not be able to prove it, that the rationale explains <u>why</u> the test

was effective. In the above example, he would say that the test is a good selection device because it measures the muscle movements that skilled carpentry requires. And he would not hesitate to try the same test again for other jobs that seem to require similar kinds of physical manipulations. Thus, the "standard" American or European tests for a given purpose have not only a statistical pedigree but also a rational explanation. The first question that must be asked from the point of view of test adaptation is whether these rationales are equally sound in a developing country. For if they are not, it would clearly be wasteful to examine the appropriateness of its content or other specific details. The need would be not for adaptation but for an entirely different approach.

On this point, the AID/AIR findings are reasonably conclusive. Most of the standard test rationales are equally valid in a developing country. Each of the tests developed in the program is based on a standard test rationale, and each is effective for the specific applications for which this rationale is intended. Though many of the physical characteristics of the standard tests had to be changed to fit local conditions, the underlying rationales remained the same. If a test of ability A was known to predict success in curriculum X in the United States, an appropriately adapted test of ability A would consistently provide comparable results for curriculum X in an entirely different cultural setting. This finding has important implications for the testing specialist, in that it permits him to apply the vast literature of testing to his work, irrespective of the cultural setting. By beginning with what is already known, he can often effect a substantial saving. The wheel does not have to be reinvented.

For the administrator or funder of test development programs, there are similar implications. In accordance with this general finding, he can appropriately use the degree to which a proposed project builds on established test rationales as one criterion for evaluation. Projects that would pioneer new rationales before checking the validity of standard approaches generally should not be undertaken. In the early days of crosscultural testing, especially in tropical Africa, much research was based on tests of unproved merit which were used mainly because they were easy to administer to unsophisticated examinees. And this is perhaps the main reason that this substantial effort had so few tangible results. Beginning with excellent rationales and then trying to solve the difficulties in applying them is likely to be much more productive.

Similarly, low priority should be assigned to a project that calls for a "new" analysis of a standard job or curriculum to determine the specific abilities that it requires in a particular country. If the component skills have already been identified in studies elsewhere, exceptions to the universal applicability of the established test ra-

tionales occur rarely. But the errors that can result from the use of an inappropriate rationale are so sizable that the logic of each proposed rationale should nevertheless be double-checked before it is used, to ensure its suitability in the local situation.

The use of achievement in earlier school courses as a predictor of performance in more advanced courses is one case in point. In the educational systems of most developing countries, the most crucial selection decisions are made at the transition from primary to secondary school, which is the make-or-break hurdle for most of the country's youngsters. And, typically, language and arithmetic achievement tests are used as the major indexes for these admission decisions. Is this an effective procedure? Looking at the results of American testing experiences, one finds that achievement tests are the best predictors of scholastic success that have been discovered so far. But a second look will show that this experience has been based largely on the testing of high school students for college admission. And so, before investing in these types of tests, it is necessary to ask whether the rationale for using achievement tests, however thoroughly validated for university admission in the United States, is logically generalizable to secondary school admission in a developing country.

The rationale for achievement tests as scholastic predictors is based on three major assumptions. The test constructor reasons that:

1. if the educational experiences that the applicants were provided by their past schooling have been approximately the same;

2. if the differences in the applicants' relative achievement, given these equivalent experiences, were the result of certain differences in their individual abilities and characteristics; and

3. if the advanced courses for which they are applying will require the same abilities and characteristics;

then the applicants should continue to achieve at different levels, just as before. The second and third assumptions are as reasonable in a developing country as in the United States. But the first assumption is not. For as heterogeneous as the American high schools are in the quality of their instruction, the primary schools of the developing countries are much more heterogeneous still. In many countries, the use of achievement tests can be expected to select not the students with the highest potential, but those who happened to attend the better primary schools. Many of the country's most talented youngsters may well be denied admission if this "standard" procedure is the one adopted.

Similar anomalies can be found in a number of other traditional rationales when applied in different cultures. It can easily be deduced, for example, that the very high predictive power that can normally be expected from English vocabulary tests will be greatly reduced when English is the second language of the examinees; that abstract reasoning tests will probably not measure "intelligence" in settings in which this skill is not practiced in preschool days; and that cross-cultural comparisons of mental ability simply cannot be made. Yet, even when such anomalies are discovered, the principle of beginning with models of excellence should continue to be applied. If one of the established test rationales does not fit, there is probably another that can be applied.

Having ruled out achievement tests as predictors of performance at the secondary school level, one should consider the alternative approaches that have proved useful. In this case he will in fact find two suitable rationales that, used in tandem, provide a highly effective selection procedure. The first is the rationale for screening tests, which are designed to eliminate unfit applicants rather than to identify those who are especially able. Here, the test constructor reasons that: 1) if students in a given curriculum must have acquired certain basic knowledge and skills in order to keep up with the instruction, and 2) if there will be little or no opportunity for remedial learning by students who do not possess these skills when they first enter the course, then applicants who do not have the necessary background should be rejected. No matter how high their native potential may be, they will fail as a result of their poor preparation. This rationale clearly can be applied for secondary school selection in any developing country. If the specific items of knowledge and skill that the secondary school course requires can be identified, and if a test that measures these items can be constructed, applicants who have not mastered them to a sufficient degree can and should be rejected. Such a screening test will turn out, it is true, to be a test of achievement; but it will differ from the achievement tests found wanting above in two important respects. The first is that its content will be based not on the primary school syllabus but on the requirements of the secondary school courses, which will narrow considerably the range of skills being measured. The second is that it will be used not to select the top 10 percent or so of the applicants who should be admitted but to screen out the bottom 30 or 40 percent to whom admission must be denied.

After the applicants have been screened with this type of test, it is necessary next to select from those who passed the initial hurdle the one out of each six or seven who will be admitted. For this purpose, the appropriate rationale is that of the scholastic aptitude test, which reasons that: 1) if a student's achievement in a given course depends in part on the kinds of mental operations this course re-

quires, 2) if there are tasks that he already knows how to perform which require essentially the same operations, and 3) if he has had sufficient practice in these tasks to have reached a fairly stable proficiency level, then this level should be indicative of the level he will attain in performing the new tasks the course will expect him to master. The prediction is quite simply that those who are able to perform related tasks better now will also perform better in the course for which they are being considered. To apply this rationale in a developing country, however, it is necessary to find related tasks that the examinees already know how to perform, a problem that will be discussed below. For now, it suffices to say that this can usually be done; and that the above two-stage selection procedure has already been tried in at least one developing country and found highly effective.

This one application has been described in some detail to illustrate the importance of analyzing a test rationale. It is not expected that the administrator will himself carry out this analysis in the depth necessary for meaningful conclusions; but he should ask the specialists who prepare the project proposal for the following: 1) a written statement of the rationale that will be followed in developing the proposed testing procedures; 2) a review of the prior applications of this rationale in other locations, and of its effectiveness relative to other approaches; and 3) an analysis of the suitability of the assumptions made in this rationale in the light of local conditions. This will usually provide him with a sound basis for judging the technical merits of the proposed undertaking.

The Specific Test Content

The above conclusions bear directly on the fundamental disagreement noted at the beginning of this article, between those who look mainly at the similarities in the job requirements and those who give more weight to cultural variations. In almost all cases, the treatment of the standard test rationales should follow the view of the former. Where the jobs are largely the same and encompass the same kinds of skill, they call for the same types of testing procedures. But when these same rationales are used to generate the specific content of the actual test exercises, the approach must shift to the opposite point of view. For the effective application of each rationale depends very much on local conditions. The best application of the identical rationale in two different locations can result in two quite different sets of test questions. It is important to note that both sets can be equally effective in the respective settings for which they were developed.

One of the clearest illustrations of this point is afforded by studies that Michael Cole carried out with Kpelle adults. Cole was interested

in the ability of "estimation," which consists of accurately judging the dimensions or measurements of something by sight. He found that the Kpelle scored far below American norms on all of the standard problems of estimation that are normally used in the American culture. But, when given a locally appropriate problem—estimating how many cups of rice there are in a bowl—illiterate Kpelle were ten times as accurate as a sample of U.S. adults. If a certain job requires this type of ability, therefore, one might find that he can select the best of a group of American applicants with a test based on the length of straight lines, and the best of a group of Kpelle applicants with a test based on the volume of rice in a bowl.

The general principle underlying this example is that an appropriate test problem will be one 1) that duplicates operations important to the course or job for which the applicants are being selected, 2) that the applicants are already able to perform at the time they are tested, 3) that the applicants have practiced sufficiently to have reached stable proficiency levels, and 4) that results in individual applicant scores that are sufficiently different to permit selection. Whether a given task actually meets the above specifications—whether estimating bowls of rice is in fact an effective predictor—is an empirical question. Until the test is actually tried, it is seldom wise to prejudge the results. In the estimation example, it may be that estimating volume is too different from the kinds of estimation involved in the actual job to meet the first of the requirements for an effective predictor. Or it may be that the fourth requirement would not be met because this skill is so highly practiced in the Kpelle culture that all applicants would earn the same score. In the absence of actual try-out data, there is no way of telling. But it does follow that rice problems or any other novel exercises should not be dismissed out of hand—so long as the rationale is sound—just because they do not conform to the "standard" exercises used in the American culture.

The AID/AIR findings on education suggest that primary school students usually do require tests substantially different from the traditional versions. But at progressively higher educational levels, the differences are progressively smaller; at the university level, some (but not all) standard tests can safely be used without modification. Unless the need for adaptation is self-evident, the administrator should ask for data showing that the standard versions cannot be applied. He should understand that adaptation will not necessarily degrade a test, but that it will not necessarily improve a test either.

The third point concerns the amount of background research that must be done to pinpoint the kinds of adaptations required. It is clear on the one hand that some research or experimentation is almost always essential. Without some studies of the type that Cole carried out in the Kpelle example, an effective estimation test prob-

ably could not be constructed. But it is also true that background research is one of the most costly steps in test construction, and the one that results in the longest delays before a test is ready for use. From the administrator's point of view, doing too much research is in many ways more debilitating than not doing enough. The two general guidelines for background research that were adopted for purposes of the AID/AIR project proved serviceable, and are recommended for other applied test development programs. The first was to do only such preliminary research as would produce specific content material for the test exercises that were to be written. The underlying dynamics of human behavior, however fascinating, would not be explored. The second was that as soon as there were sufficient test exercises to match the level of accuracy that similar tests provide in the United States, the preparatory research would stop. Further refinements would be left to later studies, and the more basic research effort would be shifted to other tests.

The development of the Verbal Analogies Test in Nigeria illustrates this approach. The objective was to design a scholastic aptitude test based on a skill of "verbal reasoning" or "concept formation." Each item was to contain an underlying concept or relationship that the examinee would have to discover, much as he has to be able to see relationships in the materials he studies in school. Thus, in an item such as

coconut and climb
cassava and ___?___
( ) eat
( ) cook
( ) dig
( ) earth

the concept of how one goes about getting this object would be the relationship to be discovered. ("Dig" is the right answer.)

There were two major technical problems in writing suitable test exercises of this general type. One was to identify a sufficient number of concepts that were at the right level of difficulty for 12-year-old Nigerian students. In a skill such as concept formation, there probably are wide intercultural variations. The other was to ensure that the test did measure individual differences in concept formation, and not in the students' relative command of the English vocabulary that solving these problems requires. (In theory, the native languages of Nigeria could have been used for this test; but because there are several hundred languages in Nigeria, this was impractical. English is the official language, and the lingua franca throughout the country. In Thailand, for example, the second-language problem does not exist; a verbal analogy test can and should be written in Thai.)

Knowledge of a second language learned mainly in school would surely be influenced by irrelevant differences in the quality of the primary schools.

With respect to the first of these problems, it was decided not to invest in elaborate research. A study of the development of concepts in the Nigerian culture would have been interesting, but not necessary to the design of the test. Simply writing down concepts that came to mind as potentially appropriate, and then trying them out, was far more expedient. The second problem, however, presented complications, for there is no easy way of looking at the results of this type of test and determining the extent to which vocabulary affected the scores. So it was decided to invest in the development of an empirical list of the English words that virtually all students know to use as source material in writing these and other verbal test items. The procedure was to collect a sample of English themes from primary schools in different geographic locations, and to tabulate how many students used various words at least once in their papers. At first, all of the words used were tabulated, and for a few dozen themes an accurate count was obtained. After that, a shortcut was applied. Whenever it became clear that a certain word was either so frequently used as to be sure to be near the head of the list, or so infrequent that it could not possibly catch up with the leaders, it was not counted in the subsequent tabulation. And when the tally reached the point at which a few hundred words far outstripped all the others, the study was stopped. The specific information needed to write 40 test exercises had been assembled.

Had this been a study of the use of English in Nigeria, the procedure used would be considered seriously deficient. It ignored much of the data, and only partially analyzed most of the rest. It did not consider the many additional words that might be in the passive vocabulary of the Nigerian student. Nevertheless this approach did produce operational tests fairly quickly; and these tests did turn out to be highly effective predictors. And that should be the overriding concern of the test constructor working against time to meet urgent operational needs in a developing country. This ultrapragmatic approach is understandably distasteful to most properly schooled researchers. And herein lies the major implication for the administrator evaluating the project design. Often it will have to be he who must ask the experts whether a study they suggest is <u>really</u> necessary for the job to be done.

A final point is that effectively adapted testing procedures may in themselves not be enough to ensure the success of the students or trainees being selected for a course of instruction (as opposed to a job). The course may have to be similarly adapted. Even though the test may be highly effective in selecting the most <u>able</u> of the applicant

group, these very able individuals may nevertheless not be ready to profit from the standard course of instruction. The more the test content has had to be adapted, in fact, the less ready they are likely to be. This difference between ability and readiness is shown in the case of the Mechanical Information Test, which was one of the most successful of the AID/AIR test adaptations. It was developed as a means of selecting applicants for technical training institutions in West African countries. And the problem of test adaptation, of course, was to measure mechanical aptitude in individuals who had little prior experience with modern mechanical devices. The task was to find technical phenomena that are readily observable in rural Africa, since the gadgets used in the American applications of the test rationale obviously would not do.

Finding and validating an adequate number of suitable test items took nearly a year. But the resulting test was highly effective for a wide variety of applications in Africa and, with some further modifications, in other parts of the developing world. Its validity in selecting technical trainees was consistently as high or higher than that being attained by the standard version in the United States. But it was also clear that the best African applicants were considerably less ready than the best of the American trainees. For while an African who can answer a test question about an oil lamp may show as much basic aptitude as an American who can answer a question about an electric light, he will operate under a considerable handicap when he enters a course in which electricity is the topic of instruction. An individual who has not the background to answer questions about electricity (or gears, or pulleys) when they appear on a test paper will have similar difficulties when he encounters them in a textbook or lecture.

Put another way, the content of the standard U.S. mechanical test is much closer to the content of the curriculum than is the content of the adapted African version. And the very fact that the tests had to move further away from the actual curriculum to be equally effective shows that the African examinee is less well prepared for the course than an American youngster of equivalent ability and potential. Selecting him with a test appropriate to his background and then subjecting him to an imported curriculum geared to the background of Americans does not make sense, yet this is frequently done. The implication is that the administrator evaluating a testing proposal should also consider the suitability of the course for which the test is to be used. If the plan is to use an imported curriculum with standard instructional materials at the established rate of speed, then the development of culturally appropriate ability tests may well be a waste of time. If, however, the aim is to develop technicians from students of high ability but varying acquaintance with basic elements of the technology in question, then an adapted ability test and

adapted course contents will be needed. And similar implications may arise with regard to job content.

The Testing Mechanics

In the early planning of the AID/AIR research, it was decided to develop tests that could be administered to large groups of applicants by people with little or no background in testing; that cost no more than a few pennies each; and that were suited to rapid scoring by hand or machine. Tests that would have to be administered individually, that would use apparatus, or that would require professional testers were rejected as too costly for use in most developing countries. This decision led to the intensive studies of the mechanics of testing that dominated the early months of the research. For it was soon found that taking a test is a highly skilled procedure that an examinee unaccustomed to objective testing cannot possibly master on the basis of the instructions typically provided. However adequate the standard test forms might be for the test-wise American or European youngster, they posed an impossible challenge for examinees who had not had this highly specialized "training." Not infrequently, the skilled operations the examinees had to learn in order to comply with the mechanics of the test exceeded in number and difficulty the operations involved in the specific skill the test was to measure.

Accordingly, it was necessary to change the format of the test papers, the manner in which instructions are given, the protocol for demonstration and practice sessions, the procedures for enforcing time limits, and other conventions; nearly all aspects of modern test practice had to be reengineered. All this had to be done, at least at the primary school level; but when done, the restulting tests did meet the criteria of economy and efficiency that had been established at the beginning of the research.

One implication of these findings is that the adequacy of standard test exercises should be checked before extensive adaptation studies are undertaken. To find out whether certain content material is suitable in the local situation, it clearly is necessary to ensure that the mechanics used in presenting it are not themselves the source of the difficulties that may be noted when it is tried. Otherwise, entirely suitable material may be ruled out because of trivial mechanical malfunctions. Even when the examinees are reasonably sophisticated, the administrator should require such editing of the mechanics as a prerequisite to content evaluation. A second implication is that proposals for the development of apparatus tests or individually administered procedures should generally be rejected. Except for a few high-risk applications (such as the selection of airline pilots or the certification of physicians, for example), the cumbersomeness and expense of such tests should be avoided. It is almost always possible

to devise a mass-administered test of the same ability, using pencil and paper alone.

Ability Testing as an Investment

In considering whether to undertake an ability testing development program, the administrator must try to assess its priority relative to the many other projects that are pending. For in most developing countries, it is impossible to fund and staff more than a small fraction of the programs that clearly are sound and that clearly are urgent. Computing the benefits of any program in terms of its overall contributions to national development has proved to be a most difficult proposition, and especially in such a field as testing. Yet, the administrator can and should be provided with as much data on the anticipated payoffs and the projected costs as can be assembled. Especially when the costs will be high or when external aid will be required, such information is essential to what often becomes a most difficult tradeoff decision.

To begin this consideration, we assume that some kind of selection method is used, e.g., for admissions to school or vocational training, and that this method does test abilities in some way. The net payoff from a change in the existing testing procedure will depend on three major factors. On the positive side, there are 1) the possible improvements in the accuracy of the decisions that are being made on the basis of the candidates' scores, and 2) the reductions of the present logistic difficulties of testing that may be effected. On the negative side, there are 3) the new problems that can arise as a result of change in the established procedure. All three factors should be considered.

Improvements in accuracy. After the new tests have been developed and used, the gains in accuracy that they provide can be measured fairly precisely. But when their development is still at the stage of a pending proposal, their eventual accuracy obviously cannot be determined; only circumstantial evidence can be assembled. If the present situation is intolerable, or if the proposed investment is modest, estimates of the exact magnitude of the improvement likely to be achieved may not be required. If the situation is less critical or if the investment is substantially higher, some quantification of the expected gains should be attempted. At an intermediate level of effort, the accuracy of the present procedures is computed and compared with the results typically obtained in other countries. The assumption that similar results will be obtained may be put to the test by carrying out an actual pilot study. But this can be done only, of course, when reasonably suitable tests are available for experimentation. To illustrate these approaches and the kinds of decisions for which they can be used, examples will be cited

from studies of vocational selection tests and of secondary school admission procedures actually observed during the study.

A senior AID official made an inspection tour of the technical training institutes in sub-Saharan Africa that the U. S. government was supporting. He found that in terms of facilities and equipment and teaching staff these were all first-class institutions, but that their output generally was appalling. The numbers of trainees enrolled were far below the capacities for which these institutions had been designed; and the proficiency of even these few trainees was lower than had been expected. The specialists he consulted attributed much of the blame to the lack of selection methods appropriate to the African culture. Suitable tests, they felt sure, would do much to resolve the difficulties that he had noted. They pointed out also that the development of tests for another culture was a highly risky proposition, and that the investment might well result in no tangible returns. Still, the magnitude of the U. S. investment in technical training was so very much higher than the costs of the testing project suggested that he decided this was a risk worth taking. Any measurable improvement, translated into U. S. training dollars, would represent an adequate return.

When the magnitude of the losses is less compelling, a more precise estimate of the probable gain is usually necessary for an adequate project appraisal. This was the case in the AIR survey of the selection program of the Malawi Polytechnic, which is the country's premier vocational and technical training institution. The records showed that the existing class of 60 trainees had been selected from a group of 1,350 applicants by a three-stage procedure. The first had been to obtain ratings on their character, scholastic ability, and attendance from their primary schools and to eliminate all applicants with less than straight-A ratings on these three characteristics. This left 200 of the original applicant group. The second stage had been to submit the application forms of these 200 to a central review panel, which selected the 120 who seemed best on paper. And the third had been to give this reduced group English and arithmetic tests, and interviews by an experienced instructor. Yet despite this methodical procedure, fully a third of the entrants had been found to be unsatisfactory even before the first term was completed. Five had been dismissed, six had been placed on probation, and nine others were being given one last chance before formal action was taken.

In view of the very favorable selection ratio (22 applicants per trainee admitted), and in light of the much better results that had been consistently obtained in West Africa with similar groups, it was concluded that the selection procedure was indeed deficient and that suitable aptitude tests would lead to substantial improvements. This approach of drawing on experience elsewhere can often provide

an entirely adequate basis for estimating the payoff potential. But in this case, because of the high cost of the infrastructure for testing that would be needed in Malawi, these and other preliminary findings justified only a more intensive feasibility check.

In a second study, the survey team administered a set of vocational aptitude tests to this same class of Polytechnic trainees and compared their scores with the grades they had been given by their class and shopwork instructors. It was found that the test scores and grades were indeed highly correlated. Then these statistical findings were converted into the numbers of selection successes and misses that would probably have occurred if these tests had been included in the initial selection procedure. The results showed that if the original pool of 1,350 applicants contained a sufficient number of potentially successful trainees—and experience elsewhere suggested that it almost certainly did—use of the tests would probably have resulted in 59 "good" selection decisions, i.e., 59 trainees comparable with the 25 better students in the existing class.

As a third example: the principal of a secondary school in northern Nigeria maintained records of the scores that all of his entering students had earned on the admission examination. After several years he systematically compared these scores with the students' subsequent academic performance. He found that during their first year of secondary schooling, the students with the top scores on the entrance test did indeed perform much better than the students who barely qualified for admission. But during the second year, the relative superiority of these high-scoring students was greatly reduced. By the fourth year, the scores on the students' admission tests and the indexes of their scholastic performance had no apparent relationship whatsoever. Students with low entrance test scores performed as well and in many cases better than those who at the time of admission had scored much higher. He concluded that the present admission procedure selected not the students with the highest potential, but those with the best preparation. They started out well simply because they had learned more at their primary schools and therefore could keep ahead of those who in fact had greater ability and potential. Their actual abilities did not emerge until sufficient time had elapsed to overcome these differences in initial preparation. And he reasoned that if the students' actual abilities are not being measured as the criterion for secondary school admission, much of the talent available in northern Nigeria is no doubt being wasted.

This analysis is persuasive. But for the decision the administrator must make, such findings are not sufficient. They indicate neither the magnitude of the loss nor the generalizability of the data throughout the region. Nor do they even demonstrate that a problem

exists: if the students admitted were all at sufficiently high ability levels, differences in motivation alone would offer an alternate explanation for what the principal had observed. Thus, more information was needed. It was decided to analyze the results of the preceding admission test together with ratings from the Ministry of Education on the quality of the primary schools in the Northern Region. This made it possible to identify "advantaged" and "disadvantaged" locations with respect to the quality of primary schooling. It was found that the highest scores of the disadvantaged set were about the same as the lowest scores of the advantaged sample. If students from the two groups were competing for admission to the same institution, the latter would inevitably be selected. To the extent that students from the disadvantaged areas were being denied admission to the secondary schools, talent surely was being wasted. And, by making certain assumptions about the actual distribution of ability and its relationship with academic performance, drawing on experience elsewhere, it was possible to estimate the probable amount of loss from the students' scores on the preceding examination.

Scholastic aptitude tests validated for use in Nigeria were by this time already at hand. Arrangements were made to administer a set of these tests to a sample of last-year primary school students in both advantaged and disadvantaged locations, shortly before the next secondary school admission tests were to be given. Then the scores on these two types of tests were compared. Comparative data were available for approximately 500 students. On the admission tests the differences between the advantaged and disadvantaged samples were as large as before. But on the aptitude tests, the average scores of the two groups were almost exactly the same. This confirmed the earlier hypotheses about the existing procedures; even more importantly, it showed that aptitude tests relatively unaffected by variations in school quality actually can be constructed. Realistic estimates of the improvements likely to be effected in northern Nigeria, therefore, could now be computed.

Improvements in testing logistics. Because of the rapid expansion of a particular country's primary schools, the number of candidates for admission to secondary school would rise from 30,000 to 70,000 within a few years. Traditionally, a set of essay tests had been used as the secondary school admission procedure. But even at the level of 30,000 applicants, the Examination Division was hard pressed to complete the marking of the papers by the time the results had to be ready for use. The projected increase in papers represented a physically impossible task. A change to objective tests was recommended, in part because these could be graded far more quickly and by persons whose qualifications need not be at the level of those who judged essays. This example has had its counterpart in a number of countries.

Negative consequences. When the expected benefits of testing programs have been tabulated and seem impressive, the possibility of negative side-effects should be explored. Any new problems created by change in the established order will either reduce the net value of payoff that has been projected, or require special corrective action that will increase the projected cost; estimates of cost-effectiveness will be affected.

The following example was noted during one of the feasibility studies. The decision to be made was whether or not test-scoring machines were a sound investment for a particular country. The advantages seemed overwhelming: the teachers who had traditionally been used as scorers clearly could not keep up with the rapidly mounting volume of testing, and the logistic problems noted above were already being encountered. On both qualitative and procedural grounds, the use of machines was the indicated solution. Yet it was also discovered that the traditional method served another important function. Under the government's austerity program the teachers' salaries could not be increased; the extra pay they received for marking the tests was intended in part as a device for raising their income to a reasonable subsistence level. Introducing machines would lead to a sizable cut in the salaries of the large number of teachers affected, and any computation of the payoff of automatic data processing that did not take this negative by-product into account would have been seriously misleading.

A quite different class of consequences is the phenomenon called the backwash effect. When the educational system is geared to a set of external examinations, the teachers will naturally tend to give greatest emphasis to the topics that they expect the examinations to cover. Topics that appear frequently are taught intently; topics that are rarely included are taught superficially or not at all. Thus it can happen that a conversion from essay tests to objective questions provides vastly superior measures from a statistical point of view, but pedagogically leads to a marked drop in the teaching of composition. Negative reactions may arise also among students, parents, alumni, or any other group accustomed to and comfortable with the traditional procedure; often an extensive public information program, carried out in advance of the change, is a necessary investment. Overall, the varieties and intensities of potentially negative outcomes can seldom be accurately predicted. Unanticipated consequences almost always occur. But an attempt at identifying as many of these side-effects as practicable should nevertheless be included as an explicit step of the evaluation procedure.

Costs and cost reduction. The cost of a new testing program consists of the capital investment that is necessary to develop an instrument ready for use, and the recurrent expenses that will be incurred

each time it is applied. The major capital costs include the preparation of the trial tests; the conduct of one or more of the developmental sequences of tryout, analysis and revision; and the collection of the statistical information that will be needed to interpret the scores when the tests are eventually given. The recurrent expenses consist of the printing, storage, and distribution of the various test papers; the administration of the tests at one or more field locations; the scoring, analysis, and reporting procedures; and the periodic revisions that must be made to change, update, or improve the tests for future administrations. And sometimes there are certain additional categories of expenditures, such as examiner training or public information programs, that also must be included.

Estimates of the developmental costs of producing a new test are necessarily approximations. It is difficult to judge the amount of research that will be required to prepare a form ready for trial, to predict the number of cycles of tryout and revision that will be necessary to produce the operational version, and to anticipate all of the contingencies that will arise. When the test is of a type never before used in a country, the risk of appreciable errors of estimate cannot be avoided. A second category of even larger errors can arise from the inclusion of procedures which are not truly essential and thereby inflate the budget, e.g., the extravagance of background research that does not contribute directly to the test content.

A second example of this is the heavy investment in test norms that has been made in a number of countries. Though it is one of the shibboleths of testing that every test should have adequate "reliability, validity, and normative data" before it is put into use, there are in fact many situations in which norms are superfluous, and these situations are more numerous in a developing country. Basically, the purpose of normative data (or large distributions of typical scores) is to permit a reasonable interpretation of an individual's test score. It may be important to know whether a score of "38 out of 50 correct" is good (enough for admission), poor (enough to warrant rejection) or in-between. Such judgments are possible only when a large and representative sample of individuals has already been tested and has provided norms with which this particular score can be compared. But when there is a large number of applicants for a fixed number of places, such external yardsticks are not required. The applicant with a test score of 38 is accepted if enough of his competitors earn lower scores, rejected if they score higher. Information on his performance relative to the general population of non-applicants is not necessary to the decision. In developing countries it is usually only the huge testing programs for which an investment in original test development is at all realistic, and most of these are of the competitive type for which preliminary normative data are not required.

The costs of using the test once it has been developed can be estimated much more accurately than the developmental expenses. If a step-by-step scenario is prepared of the entire process that will be followed from the preparation of the copy for printing to the reporting of the results, the necessary items of cost can be systematically listed and, being essentially routine, costed fairly precisely. The interpretation of the completed estimate, however, frequently does raise problems. The evaluation of the recurrent costs is generally based not on the absolute amount that will be required, but on the cost of the proposed test relative to that of the existing procedure. It is sometimes impossible to obtain an estimate of the present costs that is truly comparable to the recurrent costs of the proposed modficiation: usually, the office responsible for the conduct of the testing program has other responsibilities as well, and separate records of its expenses for each different type of activity are rarely maintained. There are single-line items for all salaries, all travel, and all printing combined; prorating these costs introduces errors of perhaps sizable proportions. A second difficulty is that the present procedure may not include certain steps that properly should be included to make it effective. Difficulties arise also in trying to attach cost figures to expenditures that do not have direct monetary implications, as when the manual scoring of test papers is done by salaried teachers without extra pay.

For all these reasons, even the hardest of cost data will usually be found to be much less clear cut than the bare figures at first suggest. Assessing the cost-effectiveness of a program makes sense, of course, only when the absolute amount of the costs could in fact be provided within the total budget that the administrator has at his disposal. If the costs are excessive on absolute grounds, the proposal must be rejected irrespective of its payoff potential. But when this does happen, an alternative approach must be sought that permits the necessary reductions in capital or recurrent costs. The most feasible way of accomplishing this is to find ways of sharing the costs among a larger number of users. In Liberia, for example, the manager of a local commercial establishment was dissatisfied with the performance of a certain specialized clerical function, and wanted to upgrade his selection procedure. His annual rate of employment for these positions was too low to justify either the capital or the recurrent cost of introducing a custom-made testing program. But there were numerous other small employers who were also experiencing difficulties in recruiting competent staff for other types of essentially clerical positions. It was thought that a series of basic clerical tests—though perhaps less effective than tests addressed specifically to the requirements of each position—might offer substantial improvements for all these employment decisions. Accordingly, a series of "general office worker" tests was developed for use with a wide variety of clerical positions; ex-

perimental tryouts confirmed that it was indeed generally effective. This solved the problem of the excessive capital cost that would have been required to develop a separate testing program for each employer.

[NOTE: The book from which the above excerpts were taken provides considerable detail on the tests that were developed and the organizational problems involved.]

Two Examples of Test Items

The Mechanical Information Test has proved to be the most consistently effective test for vocational selection in skilled trades at the post-primary level (it is too simple for use with secondary school students). The examiner asks questions verbally, not requiring applicants to understand any written instructions. The 56 items in the test use selections among groups of pictures which illustrate natural phenomena like weather, procedures like uses of fire, and commodities in common use like candles or mirrors. Research in a large sample of villages indicated that subjects like bicycles, blacksmith shops, and sewing machines were prevalent enough to be included. For the two test items shown here, the idea is: (42) all youngsters have an opportunity to watch a blacksmith at work, but not all will be interested enough to note and recall what he actually does; (44) all youngsters have seen bicycle bells, but not all will be sufficiently curious about gadgets they use to find out what is inside. Both answers depend on observations of phenomena quite different from those studied in school.

The examiner says, "When a blacksmith shapes brass, which one of these things does he use first: the water. . .the hammer. . . the anvil. . .or the fire? Mark the one that the blacksmith uses first."

The examiner says, "If you remove the top of a bicycle bell and look inside, which picture best shows what you would see inside a bicycle bell? Mark one."

[Excerpted from Ability Testing in Developing Countries: A Handbook of Principles and Techniques. New York: Praeger Publishers, 1972, pp. v-vii, 3-20, 25-44 and 127-128. All rights reserved.]

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☆U.S. GOVERNMENT PRINTING OFFICE:1972-513-961/4